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THE TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY

R.M.A.

THE TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY.

VOL. XXVII.

SESSION 1901-1902.

EDINBURGH: OLIVER AND BOYD
PUBLISHERS TO THE SOCIETY
1902.

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1882 Emmet, Dr, 93 Madison Avenue, New York.

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1882 Freund, Emeritus Professor, W. Kleiststrasse 5, Berlin.

1901 Fritsch, Prof. H., University of Bonn.

1902 Garrigues, Prof. H. J., 107 East Seventy-third St., New York.

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	Frederick Anastasius Saunders, F.R.C.S. Ed., L.R.C.P. Ed., *Grahamstown, South Africa*,	1885
105	John Smith, M.D., M.R.C.S. Eng., *Kirkcaldy*,	1885
	Allan Cuthbertson Sym, M.D., C.M.,	1885

		Date of Admission.
	Frederick J. Underhill, F.R.C.S. Ed., L.R.C.P. Ed., *British Columbia*,	1885
	William Gayton, M.D., M.R.C.P.L., M.R.C.S. Eng., *London*,	1885
	*Alexander Matthew, F.R.C.S. Ed., *Corstorphine*,	1885
110	Alexander Somerville Cumming, M.D., F.R.C.P. Ed.,	1885
	Gustave Michael, M.B., C.M., *London*,	1885
	*James Haig Ferguson, M.D., F.R.C.P. Ed., M.R.C.S. Eng.,	1885
	John Edward Gemmell, M.B., C.M., *Liverpool*,	1885
	Robert Stewart, M.B., C.M.,	1885
115	Surgeon-Captain Robert Charles Macwatt, M.B., B.Sc., C.M., 7th Bengal Cavalry, *Bombay*,	1885
	*E. H. Lawrence Oliphant, M.D., C.M., *Glasgow*,	1885
	Andrew Wallace Walker, L.R.C.P. Ed., L.F.P. & S. Glasg.,	1886
	James Hogarth Pringle, M.B., F.R.C.S. Eng., *Glasgow*,	1886
	Walter Blake Nisbet, M.B., C.M., *N. Queensland*,	1886
120	Robert Swan Aitchison, M.D., F.R.C.P. Ed.,	1886
	John Walton Hamp, L.F.P. & S. Glasg., L.S.A., *Wolverhampton*,	1886
	John Dickinson Leigh, M.B., F.R.C.S. Ed., *Scarboro'*,	1886
	James Auriol Armitage, M.D., C.M., *Wolverhampton*,	1886
	William Henry Miller, M.D., F.R.C.P. Ed.,	1886
125	John M'Call, L.R.C.P. Ed.,	1886
	Thomas Wood, M.B., C.M.,	1886
	Hugh M'Callum, L.R.C.P. & S. Ed., *Kinloch-Rannoch*,	1887
	Nutting Stuart Fraser, M.B., M.R.C.S. Eng., *St John's, Newfoundland*,	1887
	Augustus Alexander Matheson, M.D., F.R.C.P. Ed.,	1887
130	Robert Mackenzie, M.D., C.M., *Nairn*,	1887
	Simon Linton, M.B., C.M., *Onich*,	1887
	Thomas Jackson Thyne, M.B., F.R.C.P. Ed.,	1887
	W. Burns Macdonald, M.B., C.M., *Dunbar*,	1887
	John St Clair Boyd, M.D., M.Ch., *Belfast*,	1887
135	Briton Smallman Robson, M.B., C.M., *Newcastle-on-Tyne*,	1887
	Ernest T. Roberton, M.D., M.R.C.S. Eng., *New Zealand*,	1887
	*Samuel Sloan, M.D., F.F.P. & S. Glasg., *Glasgow*,	1887
	James Wm. Fox, L.R.C.P. & S. Ed., *Southampton*,	1887
	John Frederick Sturrock, M.B., C.M., *Broughty-Ferry*,	1887
140	Alexander Primrose, M.B., M.R.C.S. Eng., *Toronto, Canada*,	1887
	Arthur Perigal, M.D., M.R.C.S. Eng., *New Barnet, Herts*,	1887
	James Aitken Clark, M.B., C.M.,	1887
	Edward Carmichael, M.D., F.R.C.P. Ed.,	1887
	Percival Humble Watson, M.R.C.S. Eng., L.R.C.P. Ed., *Newcastle-on-Tyne*,	1887
145	Charles Clark Teacher, M.B., C.M.,	1887
	Robert Inch, M.B., C.M., *Gorebridge*,	1887
	Ellis Thomas Davies, M.D., M.R.C.S. Eng., *Liverpool*,	1887
	John Orr, M.B., C.M., *Eccles, Lancashire*,	1887
	*George Owen Carr Mackness, M.D., C.M., *Broughty-Ferry*,	1887
150	Francis Joseph Baildon, M.B., C.M., *Southport*,	1887
	Surgeon-Lt. Ralph H. Maddox, M.B., M.R.C.S. Eng., I.M.S., *Bengal*,	1887
	James Williamson Martin, M.D., F.R.C.P. Ed., *Dumfries*,	1887
	James Andrew Blair, M.D., C.M., D.Sc., *Newcastle-on-Tyne*,	1887
	*John Thomson, M.D., F.R.C.P. Ed.,	1887
155	Robert Kirk, M.D., F.R.C.S. Ed., *Bathgate*,	1887
	*William Fraser Wright, M.B., C.M., *Leith*,	1887
	Alexander Bruce, M.D., F.R.C.P. Ed.,	1887
	Richard Joseph Tristan, L.R.C.P. & S. Ed., *Retford, Notts*,	1887
	Robert Henry Blaikie, M.D., F.R.C.S. Ed.,	1888
160	James Hutcheson, M.D., F.R.C.S. Ed.,	1888
	A. A. Jervis Pereira, M.D., *Delagoa Bay*,	1888
	Christopher Martin, M.B., F.R.C.S. Eng., *Birmingham*,	1888
	John George Havelock, M.D., C.M., *Montrose*,	1888

		Date of Admission.
	John Pirie, M.B., C.M.,	1888
165	James Gibson Graham, M.B., C.M., *Glasgow*,	1888
	Robert Adams Brewis, M.D., C.M., *Dursley*,	1888
	John Allison, M.D., C.M., *Kettering, Northampton*,	1888
	Archibald Cowan Guthrie, M.B., C.M.,	1888
	Samuel Beatty, M.B., C.M., *Pitlochry*,	1888
170	Professor James Chalmers Cameron, M.D., *Montreal*,	1888
	Albert Edward Morison, M.B., F.R.C.S. Ed., M.R.C.S. Eng., *West Hartlepool*,	1888
	George H. Temple, M.B., C.M., *Weston-super-Mare*,	1888
	Norman L. Boxill, M.B., C.M., *Barbados*,	1888
	John Hunter Helm, M.B., C.M., *Ratho*,	1888
175	George Scott MacGregor, M.D., C.M., *Glasgow*,	1888
	William Sneddon, M.B., C.M., *Cupar-Fife*,	1888
	Thomas Watts Eden, M.B., C.M., *London*,	1888
	William Fordyce, M.D., F.R.C.P. Ed.,	1888
	Charles E. Harvey, M.B., M.R.C.S. Eng., *Sav-la-Mar Jamaica*,	1889
180	Alexander Lang Murray, L.R.C.P. & S. Ed., *New Zealand*,	1889
	*George Pirrie Boddie, M.B., C.M.,	1889
	James F. W. Ross, M.D., *Toronto, Canada*,	1889
	J. Stuart Nairne, F.R.C.S. Ed., F.F.P. & S. Glasg., *Glasgow*,	1889
	James S. Fox, M.B., M.R.C.S. Eng., *St Helens*,	1889
185	S. M'Murtry, M.D., *Louisville, Kentucky, U.S.A.*,	1889
	Hugh Jamieson, M.D., C.M.,	1889
	Thomas Wm. Nassau Greene, L.R.C.P. Ed., L.R.C.S.I., *Carlow*,	1889
	Professor John Clarence Webster, M.D., F.R.C.P. Ed., *Chicago*,	1889
	William George Aitchison Robertson, M.D., F.R.C.P. Ed.,	1889
190	William Basil Orr, M.D., C.M.,	1889
	*Edward Farr Armour, M.B., C.M.,	1889
	George Wilkinson, M.D., C.M., *Liverpool*,	1889
	*James Lamond Lackie, M.D., F.R.C.P. Ed.,	1889
	James Wilson, M.B., C.M.,	1889
195	Archibald Maclean, M.D., C.M., *Kilmarnock*,	1890
	Frederick William Lyle, M.D., C.M., *London*,	1890
	Thomas Dobson Poole, M.D., C.M., *St Anne's-on-the-Sea*,	1890
	Charles Newberry Cobbett, M.D., C.M., *London*,	1890
	Alexander William Gordon Price, M.B., C.M.,	1890
200	Hugh Shapter Robinson, M.R.C.S. Eng., L.R.C.P. Ed., *London*,	1890
	George Matheson Cullen, M.D., C.M.,	1890
	Frederick Albert L. Lockhart, M.B., C.M., *Montreal, Canada*,	1890
	Edmund Frederick Tanney Price, M.B., C.M.,	1890
	Ernest Theophilus Roberts, M.D., C.M., *Keighley*,	1890
205	Owen Foulkes Evans, M.D., C.M., *Liverpool*,	1890
	James Duncan Farquharson, M.B., C.M., *Newcastle-on-Tyne*,	1890
	Harvey Littlejohn, M.B., F.R.C.S. Ed.,	1890
	Carstairs Cumming Douglas, M.D., F.F.P. & S. Glasg., *Glasgow*	1890
	Robert Wise, M.D., C.M., *London*,	1890
210	William Russell, M.D., F.R.C.P. Ed.,	1890
	Alexander Scott Duncan, M.B., C.M., *London*,	1890
	Prof. William Keiller, F.R.C.S. Ed., *Galveston, Texas, U.S.A.*,	1890
	Michael Dewar, M.D., C.M.,	1891
	Gains T. Smith, M.D., *Moncton, New Brunswick*,	1891
215	John Hugh Alexander Laing, M.B., C.M.,	1891
	Robert Thin, M.B., F.R.C.P. Ed.,	1891
	Alexander Henry Vassie, M.B., C.M., *London*,	1891
	James Harvey, M.D., C.M.,	1891
	Alexander Henderson, M.B., C.M.,	1891
220	James Smith, M.B., C.M.,	1891
	George Balfour Marshall, M.D., C.M., *Glasgow*,	1891

		Date of Admission.
	William Booth, F.R.C.S. Ed.,	1891
	Richard T. Yoe, M.D., *Louisville, Kentucky, U.S.A.*,	1891
	Alexander Bruce Giles, M.D., C.M.,	1891
225	Hamilton Graham Langwill, M.D., F.R.C.P. Ed., *Leith*,	1891
	Herbert Ernest Lee, M.B., C.M., *Australia*,	1891
	Charles Martin, M.B., C.M., *Newton Abbot*,	1892
	William Murray Cairns, M.B., C.M., *Liverpool*,	1892
	Robert Dundas Helm, M.D., C.M., *Carlisle*,	1892
230	William Wood, M.B., C.M.,	1892
	James Thomas Moore Giffen, F.R.C.S. Ed., *Chester*,	1892
	John Alexander Robertson, M.B., C.M., *Cape Colony*,	1892
	Frank Dendle, M.B., D.P.H., *Isleworth*,	1892
	Julius Henry Beilby, M.B., C.M., *Bromsgrove*,	1892
235	Frederick Thomas Anderson, M.D., F.R.C.S. Ed., *Braunton*,	1892
	Simson Carstairs Fowler, M.B., C.M., *Juniper Green*,	1892
	Hugh Ernest Fraser, M.D., C.M., *Dundee*,	1892
	Prof. John Alexander Campbell Kynoch, M.B., F.R.C.P. Ed., *Dundee*,	1892
	Alexander Brown Ritchie, M.B., C.M., *Hulme, Manchester*,	1892
240	Walter John Shaw, M.B., C.M., *Cockburnspath*,	1892
	Robert Stirling, M.D., C.M., *Perth*,	1892
	William Henry Vickery, F.R.C.S. Eng., L.R.C.P. Lond., *Newcastle-on-Tyne*,	1892
	William Ramsay Smith, M.B., C.M., *Australia*,	1892
	A. Watson Munro, M.D., *Sydney, Australia*,	1892
245	Charles Frederick Ponder, M.B., C.M., *Glasgow*,	1892
	John Tod, M.B., C.M., *Leith*,	1892
	George Thomas C. Adams, L.R.C.P. & S. Ed., *Melbourne, Aust.*,	1892
	George Henry Walter Smith, M.D., C.M., *Sydney, Australia*,	1892
	Charles Croomhall Easterbrook, M.D., C.M., *Ayr*,	1892
250	Walter Petrie Simpson, M.B., C.M., *Bathgate*,	1892
	James Ernest Moorhouse, M.D., C.M., *Stirling*,	1892
	D. W. Johnston, F.R.C.S. Ed., *Johannesburg, South Africa*,	1892
	David George Davidson, M.B., C.M.,	1892
	Allen Thomson Sloan, M.D., C.M.,	1893
255	Robert Balfour Graham, F.R.C.S. Ed., *Leven, Fife*,	1893
	Albert Frederic Rosa, M.D., C.M.,	1893
	George Benjamin Mitchell, M.B., C.M., *Whitby*,	1893
	Henry Robins, M.D., *Jamaica*,	1893
	Linn J. Schofield, M.D., *Warrensburg, Mo., U.S.A.*,	1893
260	David Milligan, M.B., C.M.,	1893
	George Morton Wilcockson, L.R.C.P. & S. Ed., *Reading*,	1893
	John MacRae, M.D., C.M., *Murrayfield*,	1893
	Ernest Switzer Forde, L.R.C.P. & S. Ed., *Dalry, Galloway*,	1893
	George Wade, M.D., C.M., *Melrose*,	1893
265	Philip Grierson Borrowman, M.D., C.M., *Crieff*,	1893
	John Liddell, M.D., C.M., *Harrogate*,	1893
	William Herbert Gregory, M.D., C.M., *Beverley, Yorks*	1893
	James Gibson Cattanach, M.B., F.R.C.P. Ed.,	1893
	Alexander Maitland Easterbrook, M.B., C.M., *Gorebridge*,	1893
270	Robert William Roberts, L.R.C.P. & S. Ed., *South Wales*,	1894
	Claude Buchanan Ker, M.D., F.R.C.P. Ed.,	1894
	John Malcolm Farquharson, M.B., C.M.,	1894
	Charles Alexander Butchart, M.B., C.M.,	1894
	Frederick Maurice Graham, F.R.C.S. Ed., L.R.C.P. Ed.,	1894
275	Robert Hoggan, M.B., C.M., *Liberton*,	1894
	James Livingstone Thompson, M.B., C.M., *Australia*,	1894
	George Stevenson Shirt Hirst, M.B., C.M., *Withern*,	1894
	John Stevens, M.D., F.R.C.P. Ed.,	1894
	Hugh Lewis Hughes, L.R.C.P. & S. Ed., *Dowlais*,	1894
280	Sylvanus Glanville Morris, M.D., C.M., *Nantgaredig*,	1894
	Georges P. Coromilas, M.D., *Athens, Greece*,	1894

		Date of Admission.
	Thomas Easton, M.D., C.M., *Southampton*,	1894
	David Robertson Dobie, M.D., C.M., *Crieff*,	1894
	Gopal Govind Vatve, M.D., *Bombay*,	1894
285	Robert William Beesley, M.D., C.M., *Bolton*,	1894
	William A. Stephen, M.D., C.M., *Loftus-in-Cleveland*,	1894
	William Edward Fothergill, M.D., C.M., *Manchester*,	1894
	George Sandison Brock, M.D., C.M., *Rome*,	1894
	John M. Munro Kerr, M.B., C.M., *Glasgow*,	1894
290	John Montgomery, M.B., C.M., *Birmingham*,	1895
	*Robert Cochrane Buist, M.D., C.M., *Dundee*,	1895
	Robert Thomson Ferguson, M.B., C.M., *Anstruther*,	1895
	William Henry Stephenson, L.R.C.P.& S.Ed., L.F.P.& S.Glasg., *Manchester*,	1895
	Angus Vallance MacGregor, M.D., C.M., *Hartlepool*,	1895
295	Charles William Donald, M.B., F.R.C.S. Ed., *Carlisle*,	1895
	Oguntola Sapara, L.R.C.P. & S. Ed., *Lagos, W. Africa*,	1895
	John Struthers, M.B., C.M., *Transkei, South Africa*,	1895
	B. W. Broad, M.B., C.M., *Cardiff*,	1895
	Edwin Hindmarsh, M.B., C.M., *Bengal*,	1895
300	Patrick Mackin, M.D., F.R.C.S. Ed., *New Zealand*,	1895
	G. Edgar Helme M.B., C.M., *Manchester*,	1895
	Percy Theodore Hughes, M.B., C.M., *Bexley*,	1895
	John Hosack Fraser, M.B., F.R.C.P. Ed., *Bridge of Allan*,	1895
	Stewart Grant Ogilvy, M.B., C.M., *Fauldhouse*,	1895
305	Thomas Howard Morgan, M.D., F.R.C.S. Ed., *Queensland, Aust.*,	1895
	William Macrae Taylor, M.B., F.R.C.S. Ed.,	1895
	David James Graham, M.D., F.R.C.P. Ed.,	1895
	Walter William Chipman, M.D., F.R.C.S. Ed., *Montreal*,	1895
	John Cumming, F.R.C.S. Ed., L.R.C.P. & S. Ed.,	1896
310	Sol Jervois Aarons, M.D., C.M., *London*,	1896
	Robert Beveridge, M.B., C.M., *Leith*,	1896
	John Anderson, M.B, C.M., *Pitlochry*,	1896
	Thomas John Burton, M.D., C.M., *Bearsden*,	1896
	Robert M‡William Leith, M.D., C.M., *Port Elizabeth, Cape Colony*,	1896
315	Robert Gordon M'Kerron, M.B., C.M., *Aberdeen*,	1896
	Frederick John M'Cann, M.D., M.R.C.P.L., *London*,	1896
	David Robert Taylor, L.R.C.P. & S.Ed., *Ayton*,	1896
	James Curtis Whyte, M.D., C.M., *Dalkeith*,	1896
	George William Simla Paterson, M.B., C.M.,	1896
320	William Robert Martine, M.B., C.M., *Haddington*,	1896
	Robert Henry Watson, M.D., C.M., *Hamilton*,	1896
	Thomas Marshall Callender, M.D., C.M., *Sidcup*,	1896
	Lewis Grant, M.B., C.M., *Parkgate*,	1896
	Robert Robertson, M.B., C.M.,	1897
325	James Wilkie, L.R.C.P. & S. Ed., *Portobello*,	1897
	Andrew Graham, M.D., *Currie*,	1897
	Douglas Chalmers Watson, M.B., F.R.C.P. Ed.,	1897
	Roderick Murdoch Matheson, M.D., C.M., *Isle of Man*,	1897
	Robert Jardine, M.D., F.F.P.S.Glasg., M.R.C.S. Eng., *Glasgow*,	1897
330	Daniel Charles Edington, M.D., C.M., *Penrith*,	1897
	Edwin Arthur Gibson, M.B., C.M., *Glasgow*,	1897
	John Macmillan, M.D., F.R.C.P. Ed.,	1897
	Harold Sherman Ballantyne, M.B., C.M., *Dalkeith*,	1897
	Ernest Edward Porritt, M.B., F.R.C.S. Ed., *New Zealand*,	1897
335	William John Garbutt, M.B., C.M., *Birmingham*,	1897
	Henry John Forbes Simson, M.B., F.R.C.S. Ed.,	1897
	William Herbert Goldie, M.D., C.M., *Auckland, New Zealand*,	1897
	William Alexander Potts, M.D., C.M., *Birmingham*,	1897
	Angus Macdonald, M.B., F.R.C.S. Ed.,	1897
340	Bernard Samuel Story, M.D., F.R.C.S. Ed., *Annfield Plain*,	1898
	Alexander Macdonald, M.B., F.R.C.S. Ed.,	1898

		Date of Admission.
10	Johnston, Dr D. W., P.O. Box 2022, Johannesburg, Transvaal,	1892
	Livingston, Dr George R., 35 George Street, Dumfries,	1898
	M'Brearty, Dr J. Wilson, Greymouth, West Coast, New Zealand,	1899
	M'Farlane, Dr Hilda M., Stirling District Asylum, Larbert,	1901
	Martin, Dr Christopher, Cleveland House, George Road, Edgbaston, Birmingham,	1888
15	Morgan, Dr T. H., Gympie, Queensland, Australia,	1895
	Murray, Dr R. Milne, 11 Chester Street,	1880
	Ponder, Dr Charles F., 5 Ailsie Drive, Langside, Glasgow,	1892
	Ranking, Dr J. E., Tunbridge Wells,	1881
	Ross, Dr James F. W., 481 Sherbourne Street, Toronto, Canada,	1889
20	Simpson, Professor A. R., 52 Queen Street,	1858
	Simpson, Dr G. F. Barbour, 50 Melville Street,	1898
	Struthers, Dr John, Nqamakwe, Transkei, South Africa,	1895
	Vatve, Dr Gopal Govind, care of H.H. The Rajah of Miraj, Bombay, India,	1894

(*b.*) ANNUAL SUBSCRIBERS.

	Aarons, Dr S. J., 14 Stratford Place, London, W.,	1896
25	Adam, Dr George Rothwell, Carlton House, Hotham Street, East Melbourne, Australia,	1879
	Adams, Dr George T. Cooke, 58 Collins Street, Melbourne, Victoria, Australia,	1892
	Affleck, Dr J. O., 38 Heriot Row,	1869
	Ainslie, Dr A. C., 20 Newington Road,	1898
	Aitchison, Dr R. S., 74 Great King Street,	1886
30	Aitken, Dr C. J. Hill, 71 Gilmore Place,	1902
	Alexander, Dr W. A. Johnstone, 1 George Place,	1900
	Alexander, Dr W. B., 8 Blenheim Place,	1882
	Allison, Dr J., Fuller House, Kettering, Northampton,	1888
	Anderson, Dr Fred. T., Braunton, N. Devon,	1892
35	Andrew, Dr James, 2 Atholl Crescent,	1868
	Archibald, Dr J., Hazelden, Wimborne Road, Bournemouth,	1877
	Armitage, Dr J. A., 28 Waterloo Road South, Wolverhampton,	1886
	Armour, Dr E. F., 149 Bruntsfield Place,	1889
	Aspland, Dr W. H. Graham, Harbour Grace, Newfoundland,	1901
40	Badger, Dr W., Penicuik,	1880
	Baildon, Dr F. J., 42 Hoghton Street, Southport,	1887
	Balfour, Dr Andrew, 23 Abercorn Terrace, Portobello,	1877
	Ballantyne, Dr A., Dalkeith,	1870
	Ballantyne, Dr H. S., Dalkeith,	1897
45	Ballantyne, Dr J. W., 24 Melville Street,	1883
	Barclay, Dr W. J., Australasian Club, Melbourne Place,	1899
	Barnardo, Dr F. A. F., Glendhoon, Surrey Road, Bournemouth,	1899
	Barrington, Dr Fourness, 213 Macquarrie Street, Sydney, Australia,	1884
	Barry, Dr W. J. M., 17 Hickman Road, Penarth,	1898
50	Bateman, Dr F. J. Harvey, Heath End, Blackheath, London, S.E.,	1898
	Beatty, Dr Samuel, Craigvar, Pitlochry,	1888
	Beesley, Dr R. W., 135 Deane Road, Bolton,	1894
	Beilby, Dr Julius H., 39 High Street, Bromsgrove,	1892
	Bell, Dr J. Lumsden, Driffield, Yorkshire,	1884
55	Bell, Dr Robert, 29 Lynedoch Street, Glasgow, W.,	1878
	Bentley, Dr G. H., Kirkliston,	1877
	Beveridge, Dr Robert, 9 James Place, Leith,	1896
	Black, Dr Alexander, 13 Howe Street,	1881
	Black, Dr J. Watt, 15 Clarges Street, Piccadilly, London, W.,	1863
60	Blaikie, Dr R. H., 10 Mayfield Gardens,	1888

		Date of Admission.
	Blair, Dr J. A., 16 Windsor Terrace, Newcastle-on-Tyne,	1887
	Bleloch, Dr A., 2 Lonsdale Terrace,	1876
	Boddie, Dr G. P., 73 Bruntsfield Place,	1889
	Booth, Dr William, 2 Minto Street,	1891
65	Borrowman, Dr Philip G., Viewfield, Crieff,	1893
	Boxill, Dr N. L., Buttalls, St George, Barbados,	1888
	Boyd, Dr J. St Clair, Chatsworth, Malone Road, Belfast,	1887
	Brewis, Dr N. T., 23 Rutland Street,	1883
	Brewis, Dr R. Adams, Reine Barnes, Dursley, Gloucestershire,	1888
70	Broad, Dr B. W., The Sanitorium, Cardiff,	1895
	Brodie, Dr T. Scott, Haywood, Lanarkshire,	1900
	Brodie, Dr W. Haig, Battle, Sussex,	1881
	Bruce, Dr Alexander, 8 Ainslie Place	1887
	Buist, Dr J. W., 1 Clifton Terrace,	1877
75	Buist, Dr R. C., 166 Nethergate, Dundee,	1895
	Bunting, Dr W. Hartley, 74 Bruntsfield Place,	1900
	Burton, Dr Thomas J., Lonsdale, Bearsden, Glasgow,	1896
	Butchart, Dr C. A., 52 Leith Walk, Leith,	1894
	Cairns, Dr W. Murray, 67 Catherine Street, Liverpool,	1892
80	Calder, Dr H. L., 60 Leith Walk, Leith,	1882
	Callender, Dr D. A., 180 Ferry Road, Leith,	1901
	Callender, Dr T. M., Wylverley, Sidcup,	1896
	Cameron, Prof. James C., M.D., 941 Dorchester St., Montreal,	1888
	Cameron, Dr John D., 2068 St Catherine Street, Montreal, Canada,	1899
85	Campbell, Dr Alexander, 1 Clarendon Terrace, Dundee,	1885
	Campbell, Dr Malcolm, 20 Coates Crescent,	1900
	Carmichael, Dr Edward, 21 Abercromby Place,	1887
	Carmichael, Dr E. W. Scott, 6 Castle Terrace,	1899
	Carmichael, Dr James, 22 Northumberland Street,	1871
90	Carruthers, Dr G. J. R., 4 Melville Street,	1901
	Cattanach, Dr J. G., 3 Alvanley Terrace,	1893
	Chiene, Dr George L., 23 Alva Street,	1899
	Chipman, Dr W. W., 287 Mountain Street, Montreal, Canada,	1895
	Church, Dr H. M., 36 George Square,	1875
95	Clark, Dr A. W. G., 128 Braid Crescent,	1901
	Clark, Dr J. A., 4 Cambridge Street,	1887
	Cobbett, Dr C. N., 25 Church Road, Hampstead, London, N.W.,	1890
	Coromilas, Dr Georges P., 67 Minerva Street, Athens, Greece,	1894
	Cox, Dr Joshua J., Cromwell Chambers, 38 Deansgate, Manchester,	1876
100	Croudace, Dr J. H., Foregate House, Stafford,	1878
	Cullen, Dr G. M., 48 Lauriston Place,	1890
	Cumming, Dr A. S., 18 Ainslie Place,	1885
	Currie, Dr A. S., 81 Queen's Road, Finsbury Park, London, N.,	1882
	Darling, Dr T. Brown, 13 Merchiston Place,	1884
105	Darling, Dr William, 12 Antigua Street,	1900
	Davidson, Dr D. G., 9 Granville Terrace,	1892
	Davies, Dr E. T., 97 Shaw Street, Liverpool,	1887
	Dendle, Dr Frank, Overton House, Spring Grove, Isleworth,	1892
	Deverell, Dr H. C., 12 Windsor Street,	1882
110	Dewar, Dr M., 24 Lauriston Place,	1891
	Dickie, Dr J. T., 37 Lauriston Place,	1900
	Dickson, Dr George, 9 India Street,	1867
	Dickson, Dr George, 14 Ardmillan Terrace,	1901
	Dobie, Dr D. Robertson, Charlesfield, Crieff,	1894
115	Donald, Dr C. W., 28 Portland Square, Carlisle,	1895
	Douglas, Dr Carstairs, 2 Royal Crescent, Glasgow, W.,	1890
	Drysdale, Dr James K., 22 Coltbridge Terrace,	1899
	Duncan, Dr A. J., 158 Nethergate, Dundee,	1879

		Date of Admission.
	Duncan, Dr A. S., 9 Newlands Park, Sydenham, London, S.E.,	1890
120	Dunlop, Dr H. M., 20 Abercromby Place,	1884
	Dunsmure, Dr J., 53 Queen Street,	1876
	Eason, Dr John, 196 Newhaven Road, Leith,	1899
	Easterbrook, Dr A. M., Gorebridge,	1893
	Easterbrook, Dr C. C., Glengall, Ayr,	1892
125	Easton, Dr Thomas, 28 East Park Terrace, Southampton,	1894
	Eden, Dr T. Watts, 26 Queen Anne Street, Cavendish Square, London, W.,	1888
	Edington, Dr D. C., 4 Portland Place, Penrith,	1897
	Elder, Dr W. Nicol, 6 Torphichen Street,	1879
	Evans, Dr O. F., 71 Mulgrave Street, Liverpool,	1890
130	Farquharson, Dr J. D., 242 Westgate Road, Newcastle-on-Tyne,	1890
	Farquharson, Dr J. M., 2 Coates Place,	1894
	Felkin, Dr R. W., 48 Westbourne Gardens, Bayswater, London, W.,	1884
	Ferguson, Dr J. Haig, 25 Rutland Street,	1885
	Ferguson, Dr P. J. H., 20 Leopold Place,	1900
135	Ferguson, Dr R. T., Anstruther, Fife,	1895
	Finlay, Dr W. A., 50 Trinity Road,	1880
	Forbes, Dr J. Christie, Ardveich, Liberton,	1898
	Forde, Dr E. S., Dalry, Galloway,	1893
	Fordyce, Dr A. Dingwall, 15 Melville Street,	1899
140	Fordyce, Dr William, 20 Charlotte Square,	1888
	Fothergill, Dr W. E., 10 St John Street, Manchester,	1894
	Forrester, Dr C. C., 12 Greenhill Place,	1898
	Fowler, Dr Simson C., Juniper Green,	1892
	Fowler, Dr W. Hope, 5 St Vincent Street,	1900
145	Fox, Dr James S., 6 Baldwin Street, St Helens,	1889
	Fox, Dr J. W., 18 Bernard Street, Southampton,	1887
	Fraser, Dr H. E., Royal Infirmary, Dundee,	1892
	Fraser, Dr J. Hossack, Fernfield, Bridge of Allan,	1895
	Fraser, Dr J. Joyner, Hessle, East Yorks,	1880
150	Fraser, Dr Nutting S., 205 Gower Street, St John's, Newfoundland,	1887
	Frost, Dr W. E., 120 Gilmore Place,	1900
	Garbutt, Dr W. J., Fairview, Selly Oak, near Birmingham,	1897
	Gardiner, Dr Frederick, 40 Rankeillor Street,	1900
	Gayton, Dr William, Bartram Lodge, Fleet Road, Hampstead, London, N.W.,	1885
155	Gemmell, Dr J. E., 12 Rodney Street, Liverpool,	1885
	Gibson, Dr E. Arthur, 2 Queen's Crescent, Glasgow, W.,	1897
	Giffen, Dr J. T. M., 142 Boughton, Chester,	1892
	Giles, Dr A. B., 4 Palmerston Place,	1891
	Gilmour, Dr T. F., Port Ellen, Islay,	1882
160	Girvan, Dr Alexander, Whitehall House, Maybole,	1901
	Glegg, Dr R. Ashleigh, 4 Lynedoch Place,	1901
	Goldie, Dr W. H., Auckland, New Zealand,	1897
	Gracie, Dr C. B., Buccleuch Villa, Burntisland,	1885
	Graham, Dr A., Curriebank, Currie,	1897
165	Graham, Dr D. J., 28 Gilmore Place,	1895
	Graham, Dr F. M., 16 Mayfield Gardens,	1894
	Graham, Dr J. Gibson, 17 Ashton Ter., Dowanhill, Glasgow,	1888
	Graham, Dr R. Balfour, Leven, Fife,	1893
	Grant, Dr Lewis, Parkgate, Cheshire,	1896
170	Green, Dr John L., 18 Wilton Road,	1902
	Greene, Dr T. W. N., Bella Vista, Kew Gardens, Carlow, Ireland,	1889
	Gregory, Dr W. H., North Bar Street, Beverley, Yorks,	1893
	Guthrie, Dr A. Cowan, 171 Constitution Street, Leith,	1888
	Hall, Dr D. G., Woodlyn, Gatehouse-of-Fleet,	1900
175	Hamilton, Dr J. R., Hawick,	1879

		Date of Admission.
	Hamp, Dr J. Walton, Penn Road, Wolverhampton,	1886
	Hardie, Dr Thomas, 10 John's Place, Leith,	1870
	Harlin, Dr Francis W., Manchester Hospital for Consumption, Hardan Street, Deansgate, Manchester,	1900
	Harper, Dr R. A. J., Sheriffhall, Dalkeith,	1901
180	Harvey, Dr Charles E., Kingswood, Sav-la-Mar, Jamaica, W.I.,	1889
	Harvey, Dr James, 7 Blenheim Place,	1891
	Haultain, Dr F. W. N., 17 Rutland Street,	1884
	Havelock, Dr J. G., Sunnyside, Montrose,	1888
	Hay, Dr Henry, 19 Nelson Street,	1879
185	Helm, Dr J. H., Ratho,	1888
	Helm, Dr R. Dundas, 13 Portland Square, Carlisle,	1892
	Helme, Dr G. Edgar, Gloucester House, Rusholme, Manchester,	1895
	Henderson, Dr Alexander, 21 Pitt Street,	1891
	Herring, Dr Percy T., Physiological Laboratory, University of Edinburgh,	1899
190	Hewetson, Dr J., Holmfield, Reigate,	1881
	Hindmarsh, Dr Edwin, Mozufferpore, Tirhoot State Railway, Bengal, India,	1895
	Hirst, Dr George S. S., Withern, Alford, Lincolnshire,	1894
	Hobson, Dr H. Overton, 38 Leinster Gardens, Hyde Park, London, W.,	1901
	Hoggan, Dr R., Bessville, Liberton,	1894
195	Holmested, Dr C. W., Tuxford, Newark, Notts,	1900
	Hooper, Dr J. W. D., 70 Collins Street, Melbourne, Australia,	1884
	Hughes, Dr H. L., Gwernllwyn House, Dowlais, Glamorganshire,	1894
	Hughes, Dr P. T., Baldwyn's Park, Bexley,	1895
	Hunter, Dr George, 33 Palmerston Place,	1881
200	Hutcheson, Dr J., 44 Moray Place,	1888
	Inch, Dr Robert, Gorebridge,	1887
	Inglis, Dr Elsie M., 8 Walker Street,	1901
	Jamieson, Dr Hugh, 13 Rutland Street,	1889
	Jamieson, Dr James, 43 George Square,	1866
205	Jamieson, Dr J. Boyd, 43 George Square,	1900
	Jardine, Dr Robert, 5 Clifton Place, Glasgow, W.,	1897
	Jeffrey, Dr John, Glen Bank, Jedburgh,	1901
	Johnston, Dr R. J., 1 Buccleuch Place,	1899
	Keiller, Prof. Wm., 210 Levy Building, Galveston, Texas, U.S.A.,	1890
210	Ker, Dr C. B., City Fever Hospital,	1894
	Kerr, Dr J. M. Munro, 28 Berkeley Terrace, Glasgow,	1894
	Kerr, Dr J. W., 121 Trinity Road,	1901
	King, Dr J. K., The Glen Springs Sanitorium, Watkins, New York, U.S.A.,	1884
	Kirk, Dr Robert, Rowan Bank, Bathgate,	1887
215	Krüger, Dr C. H., Main St., Wynberg, Cape Colony, S. Africa,	1899
	Kynoch, Professor Campbell, 8 Airlie Place, Dundee,	1892
	Lackie, Dr James, 1 Randolph Crescent,	1889
	Laing, Dr J. H. A., 11 Melville Street,	1891
	Langwell, Dr H. G., 4 Hermitage Place, Leith,	1891
220	Lee, Dr Herbert E., Gunnedah, N.S.W., Australia,	1892
	Leigh, Dr J. Dickinson, 7 Avenue Road, Falsgrave, Scarboro',	1886
	Leith, Dr Robert M., Provincial Hospital, Port Elizabeth, Cape Colony, South Africa,	1896
	Liddell, Dr J., North View, Victoria Avenue, Harrogate,	1893
	Linton, Dr John, 60 George Square,	1863
225	Linton, Dr Simon, Cuildnag, Onich,	1887
	Littlejohn, Dr Harvey, 1 Atholl Crescent,	1890
	Lockhart, Dr F. A. L., 23 Mackay Street, Montreal, Canada,	1890
	Lucas, Dr Robert, Dalkeith,	1871
	Luke, Dr Thomas D., 95 Shandwick Place,	1901
230	Lyle, Dr F. W., 97 Gordon Road, Ealing, London, W.,	1890

		Date of Admission.
	Lyle, Dr R. P. Ranken, 20 Saville Road, Newcastle-on-Tyne,	1901
	M'Arthur, Dr W. Taylor, 1014 S. Figueroa Street, Los Angeles, California,	1901
	M'Call, Dr John, 9 Windsor Street,	1886
	M'Callum, Dr H., Kinloch-Rannoch,	1887
235	M'Cann, Dr F. J., 5 Curzon Street, Mayfair, London, W.,	1896
	Macdonald, Dr Alexander, 42 Polwarth Terrace,	1898
	Macdonald, Dr Angus, 31 Rutland Square,	1897
	Macdonald, Dr W. B., 2 Bow Mount, Dunbar,	1887
	Macdonald, Dr W. Fraser, 16 Buckingham Ter., Glasgow, W.,	1884
240	M'Gibbon, Jr., Dr John, 55 Queen Street,	1902
	MacGregor, Dr A. V., Durham House, Victoria Road, Hartlepool,	1895
	MacGregor, Dr Donald, Springmount, Jedburgh,	1900
	Macgregor, Dr G. S., 2 Burnbank Terrace, Glasgow,	1888
	MacGregor, Dr Jessie M., 8 Walker Street,	1901
245	M'Ilwraith, Dr Kennedy C., 39 Carlton St., Toronto, Canada,	1901
	Mackay, Dr George, 74 Bruntsfield Place,	1879
	Mackay, Dr W. B., 23 Castlegate, Berwick-on-Tweed,	1899
	Mackenzie, Dr R., Napier, Nairn,	1887
	Mackenzie, Dr T. C., 20 Charlotte Square,	1900
250	M'Kerron, Dr R Gordon, 1 Albyn Place, Aberdeen,	1896
	Mackie, Dr George, Boyd's Lodge, College Road, Malvern, Worcestershire,	1900
	Mackin, Dr Patrick, 12 Ingestre St., Wellington, New Zealand,	1895
	Mackness, Dr G. O. C., Fort Street House, Broughty-Ferry,	1887
	Maclagan, Dr D. W., 91 Comely Bank Avenue,	1901
255	M'Larty, Dr Malcolm, 7 Bellevue Place,	1900
	M'Lean, Dr Archibald, Crosshouse, Kilmarnock,	1890
	Maclean, Dr Ewen, J., 12 Park Place, Cardiff,	1902
	Macmillan, Dr John, 48 George Square,	1897
	M'Murtry, Dr L. S., 231 West Chesnut Street, Louisville, Kentucky, U.S.A.,	1889
260	M'Nicol, Dr P. B., 10 Pitt Terrace, Stirling,	1902
	MacRae, Dr John, Lynwood, Murrayfield,	1893
	MacVie, Dr S., Chirnside,	1881
	M'Watt, Dr John, Duns,	1879
	Macwatt, Dr R. C., 7th Bengal Cavalry, care of Messrs King, King & Co., Bombay,	1885
265	Maddox, Dr Ralph H., I.M.S., Chapora, Saran, Bengal,	1887
	Malcolmson, Dr Alexander M., 34 Madeira Street, Leith,	1901
	Malcolmson, Dr Harold, No. 9 "C" Road, Mandalay, Burma,	1898
	Manford, Dr J. S., 70 Osborne Road, Newcastle-on-Tyne,	1900
	Marshall, Dr G. Balfour, 19 Sandyford Place, Glasgow,	1891
270	Marshall, Dr William, Milnathort,	1884
	Martin, Dr Charles, Dagenham House, Newton Abbot, South Devon,	1892
	Martin, Dr J. W., Burnfoot, Cluden, Dumfries,	1887
	Martine, Dr W. R., Weston, Haddington,	1896
	Matheson, Dr A. A., 41 George Square,	1887
275	Matheson, Dr Roderick M., 2 Kingswood Grove, Douglas, Isle of Man,	1897
	Matthew, Dr Alexander, Corstorphine,	1885
	Maurange, Dr Gabriel, 6 Rue de Tournon, Paris	1898
	Melville, Dr Kenmure, 50 Comiston Drive,	1900
	Menzies, Dr David, 20 Rutland Square,	1877
280	Messer, Dr Fordyce, Helensburgh,	1866
	Michael, Dr Gustave, 5 Cambridge Place, Chestergate, Regent's Park, London, N.W.,	1885
	Millard, Dr W. W., 3 George Place,	1884
	Miller, Dr W. H., 51 Northumberland Street,	1886
	Milligan, Dr D., 11 Palmerston Place,	1893

		Date of Admission.
285	Milne, Dr W. M., 14 Newington Road,	1898
	Mitchell, Dr G. B., 1 Skinner Street, Whitby,	1893
	Mitchell, Dr R. M., 2 Gloucester Place,	1900
	Montgomery, Dr John, The Highlands, Balsall Heath, Birmingham,	1895
	Moorhouse, Dr J. Ernest, 1 Glebe Avenue, Stirling,	1892
290	More, Dr James, Rothwell, Kettering, Northampton,	1880
	Morison, Dr Albert E., Wellington Road, West Hartlepool,	1888
	Morris, Dr S. Glanville, Plâs Cwmtwrch, Nantgaredig, South Wales,	1894
	Moses, Dr O. St John, 6 Landsdowne Road, Calcutta,	1900
	Mowat, Dr John, 6 Buccleuch Place,	1884
295	Munro, Dr A. Watson, 183 Liverpool Street, Sydney, Australia,	1892
	Munro, Dr J. R., Infirmary and Dispensary, Bolton,	1901
	Murray, Dr A. Lang, Birkenhead, Auckland, New Zealand,	1889
	Murray, Dr D. R., 41 Albany Street, Leith,	1878
	Murray, Dr James, 1 Brandon Street,	1879
300	Nairne, Dr J. Stuart, 268 Renfrew Street, Glasgow,	1889
	Napier, Dr A. D. Leith, North Terrace, East, Adelaide, South Australia,	1878
	Nicholson, Dr H. Oliphant, 20 Manor Place,	1900
	Nisbet, Dr W. B., Townsville, N. Queensland, Australia,	1886
	Ogden, Dr O. Watson, 131 Sandyford Road, Newcastle-on-Tyne,	1900
305	Ogilvy, Dr Stewart Grant, Fauldhouse,	1895
	O'Gorman, Dr Patrick W., 17th Bengal Infantry, Benares, N.-W. Provinces, India,	1899
	Oliphant, Dr E. H. Lawrence, 23 Newton Place, Glasgow,	1885
	Orr, Dr John, Heather Lea, Clarendon Road, Eccles, Lancash.,	1887
	Orr, Dr W. Basil, 13 Braid Road,	1889
310	Paterson, Dr G. Keppie, 19 Albany Street,	1882
	Paterson, Dr G. W. Simla, 147 Bruntsfield Place,	1896
	Patton, Dr W. Scott. The Vicarage, Stoke St Gregory, Taunton,	1901
	Pearson, Dr C. M., 17 Alva Street,	1902
	Peddie, Dr H. Anderson, 24 Palmerston Place,	1882
315	Pereira, Dr A. A. Jervis, Surgeon to the Delagoa Bay Railway, Lourenço Marques, Delagoa Bay, South Africa,	1888
	Perigal, Dr A., New Barnet, Herts,	1887
	Pirie, Dr John, 15 Ardmillan Terrace,	1888
	Playfair, Dr John, 5 Melville Crescent,	1873
	Poole, Dr T. D., Aberdeen Cottage, Poulton-le-Fylde,	1890
320	Porritt, Dr E. E., Wanganui, New Zealand,	1897
	Porteous, Dr J. Lindsay, 83 Warburton Avenue, Yonkers, New York,	1875
	Potts, Dr W. A., 160 Hagley Road, Edgbaston, Birmingham,	1897
	Prentice, Dr W. H., 53 Dick Place,	1901
	Price, Dr A. W. Gordon, 9 Grange Road,	1890
325	Price, Dr E. F. T., 1 Middleby Street,	1890
	Primrose, Dr Alex., 100 College Street, Toronto, Canada,	1887
	Pringle, Dr J. Hogarth, 172 Bath Street, Glasgow,	1886
	Proudfoot, Dr Thomas, 30 Lauriston Place,	1884
	Rattray, Dr A. M. T., Portobello,	1869
330	Reid, Dr J. M., 5 Ravelston Park,	1901
	Reid, Dr W. L., 7 Royal Crescent, Glasgow, W.,	1880
	Reid, Dr W. Spence, Oakley, Kirkcudbright,	1880
	Rendell, Dr Herbert R., P.O. Box 606, St John's, Newfoundland,	1882
	Rhodes, Dr J. H., Vicarage Terrace, Kendal,	1898
335	Richardson, Dr William, 66 Cotham Road, Bristol,	1888
	Ritchie, Dr A. Brown, 117 Boston Street, Hulme, Manchester,	1892
	Ritchie, Dr James, 22 Charlotte Square,	1880
	Ritchie, Dr W. T., 9 Atholl Place,	1899
	Roberton, Dr Ernest, Auckland, New Zealand,	1887

		Date of Admission.
340	Roberts, Dr Ernest T., 75 Skipton Road, Keighley,	1890
	Roberts, Dr R. W., Cattybrook House, Cwmavon, near Port Talbot, South Wales,	1894
	Robertson, Dr George, Rolland House, Dunfermline,	1901
	Robertson, Dr John A., Matjesfontein, Cape Colony, South Africa,	1892
	Robertson, Dr Robert, 26 Royal Circus,	1897
345	Robertson, Dr W. B., St Anne's, Thurlow Park Road, West Dulwich, London, S.E.,	1870
	Robertson, Dr W. G. Aitchison, 26 Minto Street,	1889
	Robins, Dr H., Sav-la-Mar, Jamaica, W.I.,	1893
	Robinson, Dr H. Shapter, Talfourd House, 78 Peckham Road, Camberwell, London, S.E.,	1890
	Robson, Dr B. S., 66 Brighton Grove, Newcastle-on-Tyne,	1887
350	Ronaldson, Dr T. R., 8 Charlotte Square,	1877
	Rosa, Dr Albert F., 28 Pitt Street,	1893
	Russell, Dr W., 3 Walker Street,	1890
	Saleeby, Dr C. W., 3 Malta Terrace,	1902
	Sandstein, Dr Alfred C., Gesto House, Edinbane, Isle of Skye,	1898
355	Sapara, Dr Oguntola, Broad Street, Lagos, W. C. Africa,	1895
	Saunders, Dr F. A., Grahamstown, Cape Colony, South Africa,	1885
	Schofield, Dr Linn J., Warrensburg, Mo., U.S.A.,	1893
	Scott, Dr T. R., Musselburgh,	1880
	Shaw, Dr W. J., Cockburnspath,	1892
360	Shearer, Dr Alfred, Newtown, N. Wales,	1898
	Simpson, Dr F. D., 14 Garscube Terrace, Murrayfield,	1900
	Simpson, Dr W. Petrie, Marjoribanks Street, Bathgate,	1892
	Simson, Dr Harry, 13 Grosvenor Street,	1897
	Slight, Dr J. D., 2 Durham Road, Portobello,	1898
365	Sloan, Dr Allen T., 22 Abercromby Place,	1893
	Sloan, Dr S., 5 Somerset Pl., Sauchiehall St. West, Glasgow,	1887
	Sloss, Dr William, Hawthorn Grove, Mount Wallace, Victoria, Australia,	1902
	Smart, Dr David, 74 Hartington Road, Sefton Park, Liverpool,	1882
	Smith, Dr G. H. Walton, Pendower, Oxford St., Paddington, Sydney, Australia,	1892
370	Smith, Dr Gains T., 15 Church Street, Moncton, New Brunswick, Canada,	1891
	Smith, Dr James, 4 Brunton Place,	1891
	Smith, Dr John, Brycehall, Kirkcaldy,	1885
	Smith, Dr W. Ramsay, Central Board of Health, Adelaide, South Australia,	1892
	Sneddon, Dr William, 58 Bonnygate, Cupar-Fife,	1888
375	Somerville, Dr James W., 12 Abbotsford Road, Galashiels,	1902
	Somerville, Dr Robert, 12 Abbotsford Road, Galashiels,	1881
	Spalding, Dr William, Gorebridge,	1867
	Spence, Dr R., St Ninians, Burntisland,	1878
	Spence, Dr William, Dollar,	1884
380	Stephen, Dr W. A., Loftus-in-Cleveland, Yorkshire,	1894
	Stephenson, Dr W. H., 137 Rochdale Road, Harpurhey, Manchester,	1895
	Stevens, Dr John, 2 Shandon Street,	1894
	Stewart, Dr J. S., 15 Merchiston Place,	1884
	Stewart, Dr R., 42 George Square,	1885
385	Stirling, Dr R., 4 Atholl Place, Perth,	1892
	Stirling, Dr Stewart, 4 Coates Crescent,	1866
	Story, Dr B. S., 6 Annfield Terrace, Annfield Plain,	1898
	Sturrock, Dr J. F., Arima, Broughty-Ferry,	1887
	Sword, Dr E. R., P. O. Box 325, Brantford, Ontario, Canada,	1902
390	Sym, Dr A. C., 144 Morningside Road,	1885
	Taylor, Dr David R., St Helen's, Ayton,	1896
	Taylor, Dr William, 12 Melville Street,	1868

		Date of Admission.
	Taylor, Dr W. Macrae, 2 Randolph Place,	1895
	Teacher, Dr C., 8 Nile Grove,	1887
395	Temple, Dr G. H., Ailanthus, Weston-super-Mare,	1888
	Thatcher, Dr C. H., 8 Melville Crescent,	1877
	Thin, Dr Robert, 38 Albany Street,	1891
	Thomas, Dr G. C., Swainswick, Bath,	1899
	Thompson, Dr F. E., 20 Park Avenue, Montreal, Canada,	1902
400	Thompson, Dr James L., Castlemaine, Victoria, Australia,	1894
	Thompson, Dr John A. Douglas, Barmeal, Port-William, Wigtownshire,	1902
	Thomson, Dr A. D. R., Musselburgh,	1877
	Thomson, Dr John, 14 Coates Crescent,	1887
	Thomson, Dr J. Stitt, The Mount, Lincoln,	1877
405	Thomson, Dr T. J., 31 Morningside Road,	1902
	Thyne, Dr T. J., 2 Dean Terrace,	1887
	Tod, Dr John, 93 Ferry Road, Leith,	1892
	Tough, Dr F. W. K., 12 Primrose Street, Leith,	1901
	Tristan, Dr R. J., 28 Carolgate, Retford, Notts,	1887
410	Underhill, Dr C. E., 8 Coates Crescent,	1872
	Underhill, Dr Frederick T., 1373 Barclay Street, Vancouver, British Columbia,	1885
	Underhill, Dr T. Edgar, Dunedin, Barnt Green, Worcestershire,	1879
	Vassie, Dr Alexander H., 98 Priory Road, West Hampstead, London, N.W.,	1891
	Vickery, Dr W. H., 1 Bristol Terrace, Beech Grove, Newcastle-on-Tyne,	1892
415	Wade, Dr George, Melrose,	1893
	Walker, Dr A. Wallace, 24 Forth Street,	1886
	Wallace, Dr Abraham, 39 Harley Street, London, W.	1879
	Watson, Dr Douglas Chalmers, 22 Coates Crescent,	1897
	Watson, Dr P. H., 2 Victoria Square, Newcastle-on-Tyne,	1887
420	Watson, Dr R. H., The Glebe, Hamilton,	1896
	Waugh, Dr John, 36 Finsbury Pavement, London, E.C.,	1881
	Webster, Dr A. D., 5 Blacket Avenue	1881
	Webster, Prof. J. C., 706 Reliance Building, 100 State Street, Chicago, U.S.A.,	1889
	Whyte, Dr J. Curtis, Dalkeith,	1896
425	Wilcockson, Dr G. Morton, 183 Southampton Street, Reading,	1893
	Wilkie, Dr James, Selville House, Portobello,	1897
	Wilkinson, Dr George, 109 Park Road, Liverpool, S.,	1889
	Will, Dr J. C. Ogilvie, 17 Bon-Accord Square, Aberdeen,	1867
	Wilson, Dr James, 53 Inverleith Row,	1889
430	Wilson, Dr T. D., 10 Newington Road,	1879
	Wise, Dr Robert, 5 Weston Park, Crouch End, London, N.,	1890
	Wood, Dr Thomas, 182 Ferry Road,	1886
	Wood, Dr William, 5 Roxburgh Street,	1892
	Woodside, Dr J. T., 5 Roden Ter., Woodstock Road, Belfast,	1898
435	Wright, Dr W. F., Bonnington Mount, Bonnington Terrace,	1887
	Yoe, Dr Richard T., 2103 Floyd Street, Louisville, Kentucky, U.S.A.,	1891
	Young, Dr H. C. Taylor, 209 Macquarie Street, Sydney, New South Wales,	1900
	Young, Dr Peter, 43 Heriot Row,	1859
	Young, Dr Peter A., 25 Manor Place,	1871

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TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY,

FOR SESSION LXIII., 1901–1902.

MEETING I.—NOVEMBER 9, 1901.

Dr R. MILNE MURRAY, *President, in the Chair.*

I. *The Treasurer* (*Dr Wm. Craig*) made his annual statement, which is given below:—

INCOME.					
Balance from Session 1899–1900,				£452	3 10
Arrears,	£9	12	0		
Bank Interest on Deposit Receipts,	5	7	8		
Interest on Consols,	6	12	4		
Entrance Fees from 40 new Ordinary Fellows,	42	0	0		
Annual Contributions from 359 Ordinary Fellows,	89	15	0		
Composition for Life-Membership from 3 Ordinary Fellows,	15	15	0		
Transactions sold,	6	7	11		
				175	9 11
				£627	13 9
EXPENDITURE.					
Royal Medical Benevolent College,	£5	5	0		
John Reid, Shorthand Reporter,	8	8	0		
Commission to Collector,	1	7	0		
Fraser's Account,	0	1	3		
Door-keeper's Salaries and Gratuity,	3	12	6		
Carriage of Parcels, etc.,	0	0	6		
Oliver & Boyd's Account for Vol. XXVI. of Society's Transactions (520 copies),	105	17	4		
Oliver & Boyd's Account for Printing Billets, Postages, etc.,	31	14	10		
Rent of Rooms at 5 St Andrew Square,	4	10	0		
Waterston & Sons' Account,	7	7	0		
The Secretaries and Editor for Postages,	1	5	2		
				£169	8 7
Balance to New Account,[1]				458	5 2
				£627	13 9

[1] Of this Balance the sum of £250, 10s. 6d. is invested in 2¾ per cent. Consols.

The accounts were audited by Drs W. Taylor and J. W. Ballantyne, and found correct.

Prof. Simpson proposed, and *Dr Berry Hart* seconded, a hearty vote of thanks to the Treasurer, which was unanimously agreed to.

II. The Society then proceeded to the election of Office-bearers for the present session, and the President announced the result as follows:—*President,* Dr James Ritchie; *Vice-Presidents* (*Senior*), Dr Haultain, (*Junior*), Dr Haig Ferguson; *Treasurer,* Dr Wm. Craig; *Secretaries,* Dr W. Fordyce and Dr Lamond Lackie; *Librarian,* Dr Haultain; *Editor of Transactions,* Dr Lamond Lackie; *Members of Council,* Professor Simpson, Drs J. W. Ballantyne, Boddie, MacVie (Chirnside), Milne Murray, Berry Hart, Brewis, and R. C. Buist (Dundee).

III. The following gentlemen were elected Ordinary Fellows of the Society:—R. Ashleigh Glegg, M.B., Ch.B., 13 Grange Terrace, Edinburgh; W. Scott Patton, M.B., Ch.B., The Vicarage, Stoke St Gregory, Taunton, Somerset; D. W. Maclagan, M.B., Ch.B., 91 Comely Bank Avenue, Edinburgh; Kennedy C. M'Ilwraith, M.B. (Toronto), Member of the College of Physicians and Surgeons, Ontario, 39 Carlton Street, Toronto; R. A. J. Harper, M.B., Ch.B., Sheriffhall, Dalkeith; W. H. Prentice, M.A., M.B., Ch.B., 53 Dick Place, Edinburgh; Alexander Mowatt Malcolmson, M.B., Ch.B., Leith Hospital, Leith; Thomas D. Luke, M.B., 95 Shandwick Place, Edinburgh.

IV. VALEDICTORY ADDRESS.

By Dr R. Milne Murray, F.R.C.P.Ed., Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

The time has now arrived when it falls to me to restore to you the trust you placed in my hands when, two years ago, you elected me to the Presidentship of the Edinburgh Obstetrical Society. Before I do so, I desire to take this opportunity of thanking you most cordially, not only for the great honour you

did me in electing me to this Chair, but more especially for the kindness and consideration you have, during my tenure of the office, invariably extended to me.

I accepted the office with diffidence, in view of the traditions which cling to it, but, apart from a consciousness of many shortcomings in the discharge of its duties, these two years during which I have had the honour of presiding over your deliberations will remain with me as a memory associated with the keenest pleasure.

I feel sure I may also take this opportunity of thanking, in your name as well as on my own account, the various officials of this Society, whose interest in its welfare, and whose energy on its behalf, do so much to maintain its traditional vigour and vitality.

We owe our best thanks to our Secretaries, Dr Haig Ferguson and Dr Fordyce, not only for the efficient discharge of their routine duties, but also for the energy they have shown in securing for each meeting a billet full of attractive papers and interesting specimens.

To Dr Brewis, our Editor of *Transactions*, we also owe our hearty acknowledgments. The new departure which we made last session, in obtaining shorthand reports of our discussions, while it has, I feel sure, greatly enhanced the value of our *Transactions*, has also greatly added to the duties of the Editor. That these have been worthily discharged, I think you will admit our new volume shows.

Less exacting are the duties of our Librarian, Dr Haultain. They are indeed, at the present time, largely mechanical, consisting in the main in carrying home with him for safe keeping, the various volumes which the kindness of cognate societies send us in exchange for our *Transactions*. For the discharge of these duties of transport and storage, which our Librarian so faithfully performs, we tender him our thanks: and I have no doubt that if the Society can some day see its way, as I venture to hope it will, to establish a local habitation for its Library, which is already considerable, and which could readily be extended, we shall find in our Librarian one who is in every respect equal to the task of arrangement and organisation.

When I come to speak of our obligation to our Treasurer, I am indeed at a loss to find suitable words. No higher testimonial to the devotion and faithfulness which he brings to the discharge of his duties need be sought than that which we find in the financial statement which he has just submitted to us. For six-and-twenty years Dr Craig has served this Society, in the office of Treasurer, faithfully and well—how faithfully and well, those of you who have joined our ranks in recent years may in a measure realise, when I say that the position of our Society as to membership and as to finances, we owe chiefly to the manner in which our Treasurer has discharged the duties of his office.

We are well aware that to Dr Craig we owe the suggestion that the annual volume of the *Transactions* should be presented to each Fellow of the Society, and it was by him that the scheme by which this was possible was organised and carried out. By this scheme the *Transactions*, which were formerly a cause of loss to the Society, have now become a means of great gain. Not only is our financial position sound, but our membership has been greatly enhanced, and our *Transactions* now reach every corner of the globe. Thus it is that our work here is so widely known and so highly esteemed.

When at the commencement of last session Dr Craig had completed his twenty-fifth year as Treasurer, a suggestion was made by many Fellows of the Society that this happy union, like some of similar duration in other relations, should be appropriately celebrated. This suggestion was considered in your Council in an informal manner, and it was resolved to recommend to you that a modest portion of our surplus funds should be employed to commemorate in a suitable way both our Treasurer's long and faithful service and our gratitude.

But no sooner did our friend become aware of this proposal, than with a courteous peremptoriness, acquired no doubt by long practice in dealing with negligent and recalcitrant Fellows, he wrote to the Secretary requesting that the proposal should be abandoned, commenting on his own services in the most modest way, and declining any such acknowledgment of them as we had proposed to make.

Much as we should have been gratified had Dr Craig seen his way to fall in with our suggestion, we had no choice but to bow to his wish in the matter. But I am sure I am expressing the feelings of you all when I tender him our cordial thanks for his long and faithful service, and for all the care and time he has bestowed on the duties of his office in the years gone by; and we sincerely hope that he may be able for many years to regulate our finances and control our exchequer.

It is a matter of profound satisfaction to me that I resign this Chair to my successor at a time when the Society is in a state of robust vigour, doing good work, and giving ample promise of future efficiency.

Our financial condition is eminently sound; our membership is increasing in a way which shows that the interest in our work is sincere and widespread, and I think we may feel assured that the quality of our work is not unworthy of the traditions and fame of our Society. It is, however, meet at a time like this, when we first assemble at the commencement of a new session, that we should take account of the gaps which the hand of death has made in our ranks during the past two years. During this period we have to mourn the loss of two of our Honorary Fellows.

Dr George Apostoli, who was elected in 1890, was born in St Michel-de-Lanes in 1847, and was the son of a physician there. He received his medical education in the military school, Strasburg, and became a Doctor of Medicine of Paris in 1872. He joined the Army Medical Service, and spent seven years in Algeria as a Military Surgeon. Transferred after this to the garrison at Versailles, he devoted himself to ophthalmology, but soon after he became acquainted with Tripier, and this changed the direction of his studies, and interested him in electro-therapeutics. In 1882 he retired from the military service, and thereafter turned his attention chiefly to the treatment of fibroid tumours of the uterus. In 1884 the details of his method, and the results claimed for it, were discussed in an elaborate thesis by one of his pupils—Dr Carlet—and they were so remarkable that they at once attracted attention. As is well known, the method of Apostoli

consists in the transmission of currents of considerable amount —amounts far larger than had ever previously been employed —through the uterus and tumour. This was accomplished by methods, the details of which were carefully worked out by him. To understand the great interest taken in the results gained by Apostoli, we must remember that at this time the surgical treatment of fibroids was in an exceedingly elementary state. Keith, Tait, and Bantock, among others in this country, Schrœder, Olshausen, Sänger, and many others in Germany, were feeling their way to more satisfactory and successful methods of hysterectomy; but even in the hands of Keith, whose results were as good as any, and better than most, the operation was anything but an ideal one. It was only natural, then, that the announcement of a method which claimed to cure uterine fibroids symptomatically, with apparently no great risk or other inconvenience, should be hailed with the utmost interest, and speedily put into practice. Its application seemed to involve little risk to the patient, and less skill on the part of the operator, and its practice became the fashion of the day. Keith, who in spite of his success, welcomed a mode of treatment which promised to relieve him, in a great measure, of an operation which he always dreaded, became speedily convinced of its utility, and obtained results which, while they were depreciated by some, satisfied him, and encouraged others to persevere. It need hardly be said that the results generally obtained fell far short of the expectations formed. This discrepancy was not difficult to explain. Firstly, there is no doubt that Apostoli's cause suffered from the misinterpretation of his claims, due largely to the forms of expression used by him and his pupils in stating them. His Gallic enthusiasm did his cause an injury which might have been prevented had this enthusiasm been tempered with a modicum of Scottish caution. Secondly, it was unfortunate that the apparent simplicity of the procedure tempted men who knew little of gynæcology, and less of electrical methods, to try their hands, with results which could be easily predicted. On the other hand, some who gave it a fair trial were discouraged, partly by the tedium of the process of treatment, partly by the fact of its uncertainty and ineffi-

ciency in certain cases, however gratifying its results might have proved in others.

This is not the occasion to discuss at length the ultimate value of Apostoli's contribution to gynæcological therapeutics, but I venture to assert my firm belief that, in spite of its inconveniences, its tedium and its uncertainties, Apostoli's method would have been in general vogue to-day had it not been for the extraordinary success which, in the hands of experts, has attended the surgical treatment by hysterectomy of fibroid tumours. It is a much more expeditious procedure to extirpate the uterus and tumour by a single operation, than to cure it symptomatically by electrical applications during two or three months—always supposing the patient does not die in the former case. But, on the other hand, there are multitudes of women suffering from the presence of a fibroid tumour, who shrink from the suggestion of the knife, and refuse to submit to any surgical procedure. That a very large number of these may be symptomatically cured by Apostoli's method does not admit of doubt, and I do not despair of the time coming when a woman may have some choice between a proposal for a hysterectomy and the somewhat melancholy consolation to be derived from the assurance that very few women die from a fibroid.

Sir William Overend Priestley, grand-nephew of the great chemist, was born in June 1829. After a distinguished career in Edinburgh as a student he took his degree of M.D. with high honours. In 1851 he published a paper on Pelvic Cellulitis, which attracted the attention of Sir James Simpson, for soon after this, Simpson appointed him his assistant. At this time Simpson was in the zenith of his fame, and patients from all parts of the world crowded his rooms. This association was of the highest value to him, for when he moved to London in 1855 he speedily formed an extensive connection and developed a lucrative practice. No doubt much of his success was due to his connection with Simpson, but more was due to his inherent ability and to the charm of his personality. Shortly after his removal to London he became obstetrical physician to the Middlesex Hospital, and also joined the staff of the Samaritan Hospital. On the death of Arthur Farre in 1863, he was

appointed to the Chair of Midwifery in King's College, and to the obstetrical physicianship of the Hospital. This appointment he held for a short time only, for in 1864 an attack of diphtheria, followed by a tedious recovery, determined him, at the age of forty-three, to relinquish these appointments and to confine himself to private practice. For many years he was the most fashionable obstetric physician in London. In 1893 he was knighted, and in 1896 he was elected M.P. for the Universities of Edinburgh and St Andrews, and he retained this seat till his death in April 1900. Priestley's early promise as a contributor to obstetric science and literature was never fulfilled. His premature separation from teaching, and his absorption in practice, sufficiently explain this. His chief contributions to literature are the Lumleian Lectures on Intra-uterine Death, and articles on Hæmatocele in Albutt and Playfair's Gynæcology, and Reynold's System of Medicine. It has been well said of him that all through his life he made troops of friends, but never an enemy.

From the roll of Corresponding Fellows we have lost one, Dr Thomas Cayzer, of Liverpool.

From the roll of Ordinary Fellows we have lost no less than nine:—Dr John Cunningham, New Zealand; Dr George Elder, Edinburgh; Dr John Henderson, Leith; Dr William Husband, Edinburgh; Dr William Johnston, Stirling; Dr James Thomson, Jersey; Dr John D. Williams, Cardiff; Dr James Foulis, Edinburgh; Dr John Connel, Peebles. Among these we number the two senior Fellows of the Society, Dr Henderson and Dr Husband. Both these gentlemen were elected Fellows in 1857.

Dr William Husband, early in his life, turned his attention to the subject of vaccination, and for many years was superintendent of the Central Vaccine Institution. His name is best known in connection with the invention of the capillary tube for storing lymph. A man of singular modesty and sincerity of character, and of earnestness and faithfulness in all things, he won and retained the affectionate respect of a wide circle of patients and professional brethren.

The death of Dr George Elder in the early days of 1900, after four days' illness, came with a shock of painful surprise

to all his many friends. He had endeared himself to many by the simplicity of his character and by his great personal charm, and the work he had already done had proved to be of outstanding promise. We looked to him as one of the younger men who was likely to maintain the traditions and the reputation of our School, and his death at the age of twenty-nine touched us all with a sense of personal loss.

No one who was present at our last meeting on the 10th July could have imagined when James Foulis sat down, after having spoken in the discussion on the third stage of labour, with all his characteristic vigour and incisiveness, that we had listened to the last contribution he was ever to make to our debates. Yet even then he spoke in the shadow of death. A neglected attack of influenza, contracted in the spring of this year, aggravated a cardiac ailment from which he had long suffered, and at the date referred to he was dragging himself through his day's work with a feeling of growing exhaustion and distress. It was characteristic of the man that his interest in our meeting was even then greater than his weakness. A short rest in the country during August failed to restore him, and on his return home in September, after a courageous effort to see some of his patients, he lay down, never to rise again, and, as the leaves began to fall in October, he passed to his rest. No one who came in contact with Foulis failed to recognise in him a strong personality. You could not doubt the earnestness nor the sincerity of his thoughts, even though his views appeared often unconventional and sometimes bizarre. He had keen scientific instincts, and his interest in the scientific aspects of medicine never flagged. In an early period of his career he did excellent work on the development of the ova, and made a contribution to our knowledge of the highest value; but his absorption in a busy and exacting practice prevented him from following what seemed his natural bent, though to the last he kept his interest in developmental work unimpaired. No one could fail to admire the beauty of the dissections of the early embryo and its membranes which he demonstrated to us here from time to time. When Foulis fairly entered on practice he gave himself up to his work. His first and last thought was his patients, and his chief anxiety was to find out what was

best for their interests. When we consider what he did for them we need not be surprised that he won their deepest esteem and unwavering confidence. No man was more trusted, and no man deserved it more. It is touching to hear the terms of affectionate respect in which he is spoken of by his patients, and it is plain that he was to them not only a trusted physician, but also a steadfast friend. We who sit round this table will long miss his familiar face and his ready word, but we shall cherish the memory of one whose love of what is good, beautiful, and true, and whose high sense of duty, stamped him a man of sterling worth and character.

By the death of Dr John Connel of Peebles, which occurred on the 4th of this month, the Society loses one of its most distinguished country Fellows, and one who had been its President. His career as a student, first in St Andrews and afterwards in Edinburgh, was marked by high distinction, and for many years he has been one of the best known, and regarded as one of the ablest, practitioners in the south of Scotland. He joined this Society in 1869, and he evinced his interest in our work by frequent attendance at the meetings, often at great personal inconvenience. When, in 1883, the Council resolved to recommend a country Fellow for election to the Presidential Chair, Connel was chosen for the honour, and a wise choice it proved. The two addresses he gave from this Chair adorn our *Transactions*. They are stamped as the product of a highly cultured mind, and are models of literary form. But they are more than this—they show forth a mind which, by the exercise of a luminous intellect, has attained the highest ideals and reached the deepest convictions.

He was one of those men who impressed you with the feeling that he never spoke without thinking, and that his thought came from the sanest of brains. The saneness of the man impressed you as much as anything about him, so much so that if you differed from him you felt it necessary to revise your judgment. I have often thought that if Connel had chosen to specialise, he would have made an admirable consultant; but I am not sure that, even in such a capacity, he would have been so much the power for good he has been, giving himself as he has done, not only to the individual interests of his patients,

but likewise, and with his whole heart, to the social and moral welfare of the community in which his lot was cast.

> "So his life has flowed
> From its mysterious urn a sacred stream,
> In whose calm depth the beautiful and pure
> Alone are mirrored; which, though shapes of ill
> May hover round its surface, glides in light,
> And takes no shadow from them."

At the opening meeting of our last session, within a few weeks of the close of the nineteenth century, I ventured to direct your attention to the melancholy fact that in spite of all that had been accomplished in the science and art of medicine, the puerperal mortality from septicæmia had not diminished during the past fifty years. I trust it may not seem to you inappropriate that at this, the opening meeting of our first session in a new century, I should ask your attention to one or two suggestions towards bringing the results of obstetric practice more into line with the ideals of obstetric science. In the address to which I have referred, I expressed the opinion that the results of private practice fell short of those of the best hospital practice, mainly because, in the first place, there was far too much meddlesome interference with a natural process, and, in the second place, because, even when interference was indicated, it was often carried out with a total disregard to those principles which have been the basis of the triumphs of modern surgery in other departments. Now, gentlemen, if I am right in the views I then expressed and still maintain, it seems to me that the wide persistence of these vices of practice must be due to some radical defect in the teaching of obstetrics in our schools. It is, to my mind, inconceivable that if men were thoroughly and properly trained in obstetrics they could err so greatly, as many of them seem to do, in the very elements of its practice. We must, I fear, if we are to go to the root of the matter, confess that we who are teachers of obstetrics either fail in some way to impress our students with the grave responsibility they incur in assuming the care of women in parturition, or else we fail to equip them with the knowledge requisite to fit them to meet that responsibility. If this is so, it is a matter of the most urgent importance that we

should recognise it. I make no apology for bringing this under the consideration of a Society, every Fellow of which is directly interested in the practice of obstetrics, and whose Fellowship includes not only every teacher of obstetrics in Edinburgh, but most of those in Scotland, and many of those in other countries; and I do not think I presume upon your interest when I ask you to consider with me how far the teaching of obstetrics in this country falls short of, or realises, what that ideal teaching should be.

As the subject is dealt with in all our Scottish and most of our English schools, it falls into two sections: (1) *Midwifery*, which is concerned with the normal function and abnormal manifestations of the reproductive process; (2) *Gynæcology*, which deals with the diseases and disorders of the reproductive organs.

Until comparatively recently, the first department absorbed almost all our attention. Our knowledge of the diseases of the organs of reproduction in the female was comparatively limited, our means of diagnosis were indefinite and unsatisfactory, and even more restricted was our power of treating or alleviating them. During the last quarter of last century, however, the great advances, first, in pathological knowledge, and even more so in the department of abdominal surgery, have raised the study of the diseases of the female reproductive organs to be one of the most important in practical medicine. In no department of the healing art have greater triumphs been achieved, in none has the application of scientific principles to the relief of suffering and disease met with a more ample reward. So much so is this the case that we are, year by year, finding the time placed at our disposal becoming more and more inadequate for a reasonable consideration of the full scope of our subject. The increasing importance of gynæcology tends either to displace obstetrics from its former position of pre-eminent importance, or, on the other hand, there is the danger that the pressing claims of scientific and practical obstetrics prevent anything like an adequate consideration of the immense advances which recent gynæcology has achieved. Under these circumstances it is becoming daily more plain to me that some re-arrangement of the work which we are required to overtake must be made, unless both subjects are to suffer. It is obvious that there is a

grave danger that an attempt to overtake an adequate treatment of obstetrics, and a reasonable study of modern gynæcology in the same time as sufficed twenty-five years ago, is certain to lead to the prefunctory and slip-shod treatment of one or both departments, and that much of the gain of recent years may be lost to the student if presented in such a way as to lead to scientific confusion and indefinite perspective.

It seems to me that the time is rapidly approaching when, in the interest of what I deem to be one of the most important departments of scientific and practical medicine, the subjects of obstetrics and gynæcology must be dealt with in different courses. This seems absolutely essential if, on the one hand, the young practitioner is to begin his work equipped with a sound working knowledge of obstetrics; and if, on the other hand, the essential principles of gynæcological diagnosis and pelvi-abdominal surgery are to be adequately taught, or if the scientific knowledge and practical advances of recent years are not to be ignored by the schools.

I am well aware that, to some of the teachers in this and other schools who are specially interested in other departments, a comparatively easy solution of our difficulty presents itself. We are told that, in this school at least, far too much time is devoted to the study of obstetrics; that half, or less than half, the time at our disposal is ample for our purpose, and that the time saved from obstetrics may be applied to the necessary expansion of the teaching of gynæcology.

These, gentlemen, point out to us that it is absurd that what they term a "limited and restricted subject like midwifery" should occupy the student for the same length of time as a subject like general surgery or medicine. If *they* are expected to overtake the whole subject of medicine in a hundred lectures, surely fifty should suffice for our small department. This to the casual observer may seem an adequate argument; to my mind it is wholly specious and illusory. In the first place, it is not possible to overtake the whole of the details of the principles and practice of medicine or surgery in one hundred lectures, or anything like a hundred lectures; and most teachers who confine their prelections to the limits of a single course restrict themselves to an exposi-

tion of the principles of their subject as a whole, and a detailed account of one or more departments of it. As a matter of fact, most students take two courses on both of these subjects, and even then find that a large part of their working knowledge has to be obtained from text-books. And this seems a sufficiently adequate treatment of the subject. If a young practitioner is possessed of a sound knowledge of the great principles which underlie the scientific practice of medicine and surgery, and has a reasonable knowledge of the details of the diagnosis and treatment of the more common and urgent maladies and disorders—a knowledge which he can obtain in relation to these subjects in a way which, as I shall show, is entirely denied him in the teaching of obstetrics —he is sufficiently equipped for entering on the work of his profession so far as these subjects are concerned. If he is acquainted with the general principles of the treatment of fractures and of fevers, he cannot go very far astray in the management of these conditions, and he is not likely to commit any irreparable blunder in dealing with them, or one which he cannot rectify by the knowledge obtained by the consultation of authorities on the subject.

But in the department of obstetrics the case is materially different, as a very brief consideration will show you. The processes of pregnancy, parturition, and the puerperium are, in the majority of cases, perfectly natural functions, which, following physiological laws, require no interference or management, in the strict sense of the term, and which are accomplished with, no doubt, a temporary strain, but without any permanent disability of the individual concerned. As I have said, the great majority of obstetrical cases come under this class; but there is, on the other hand, a very considerable minority of cases in which the process departs from the normal, becomes pathological in the highest degree, and in which two lives may become suddenly jeopardised, and one of them, if immediately saved, exposed to risk of permanent damage and depreciation.

Consider for an instant some of the complications the ordinary obstetrical practitioner may at any moment be called upon to meet, such as hæmorrhage (accidental, unavoidable,

post-partum, or that occurring during an abortion), eclampsia, transverse presentation, face presentation, impacted breech cases, rupture of the uterus, hydrocephalus, prolapse of the cord.

How, let me ask, can these be managed on general principles?

Each condition is one which must be dealt with as being *sui generis*, and the most junior of practitioners must be prepared to treat these conditions by himself and at once. There is seldom time to consult books, or to seek the aid of men of more experience or resource. If the appropriate treatment cannot be provided at once, it may be in great measure useless. If a patient is seized with post-partum hæmorrhage, there is nothing to be gained in sending for a consultant. If the man on the spot is not able to stem the flow of blood, the woman will in all probability be dead before the consultant arrives, and his duty will be limited to explaining to the patient's friends that a certain proportion of cases of labour end fatally from hæmorrhage in spite of the most skilful treatment. It will perhaps be well for the practitioner if they do not inquire too closely whether this one properly belongs to this category. What I desire to point out then is this, that in practical obstetrics the practitioner is brought face to face with a larger number of cases which are dangerous to life, and which must be dealt with *as they arise*, than he will meet with in either medicine or surgery. Further, almost every practitioner will at some time, at any rate, be engaged in obstetrical practice, and liable to be charged with the responsibility of those cases; while many may be so situated that they may practice in districts where a surgical case is a rarity, and their skill and capacity may seldom be put to the test.

Every one knows that the greater part of the work of a general practitioner is concerned with the ailments of women and children, and the greater part of a woman's troubles are concerned with, or spring from, her functions of reproduction. Therefore I maintain that the most important part of the equipment of the general practitioner is a sound knowledge of the principles and practice of obstetrics and the elements of gynæcology. Not only will his reputation be made or marred by his success or failure in this department, but his confidence in himself and his comfort in his work will largely depend on whether

he possesses such a knowledge of obstetrics as will enable him to meet with adequate skill the pressing and unavoidable demands which will be made on him from time to time in its practice.

This being so, I maintain that a reasonable part of the medical curriculum should be put aside for the training of the student in this department, and my experience as a teacher has proved to me that the time at our disposal is by no means too long. By judicious use of our time it is possible to give a reasonable view of Midwifery and of Minor Gynæcology, but it is quite impossible in the one hundred hours of our course to deal with the great advance of recent gynæcology; to describe the details of the diagnosis of abdominal tumours and the rarer pelvic diseases, and to consider with any care the refinements of the technique of gynæcological surgery.

But, on the other hand, there is no real need for the student to master these details. They are outside any reasonable demand that can be made on him, and time spent in trying to master them is time taken from a work of far more pressing importance.

My position then is this, that I should confine the ordinary course of midwifery to a careful review of the whole subject of obstetrics, and that of the simpler modes of gynæcological diagnosis and the elementary study of the diseases of women; and I should transfer the subject of gynæcology outside this, including pelvic and abdominal surgery to a special course, on the same lines as diseases of the eye usually are dealt with at present.

Our business as a School of Practical Medicine is to equip the young practitioner with a sound working knowledge of his profession in the first place, and in the second to provide every facility for all who desire to devote themselves to special departments of medicine and surgery. And it seems to me, that so far as this department is concerned, the re-arrangement I suggest is adequate and appropriate. I am well aware that such a re-arrangement as I suggest means a new Chair, and that means more money. But that should be no insuperable obstacle. I do not suggest that this should be met by an appropriation from the regal benefaction of Mr Carnegie. It appears to me

that if all the claims that are being made on it are to be satisfied, there will be little left for such a purpose as I suggest.

Whether that gift is to be mainly for good or for evil remains yet to be seen, but it would be wholly evil if, while its institution largely abolishes that inducement to self-denial and sacrifice which has been a traditional pride in a large section of the Scottish poor, it should at the same time dry up the fountain of the benevolence of those who have and to spare.

It has for many years been a prominent feature of the Scottish Universities, that in their medical curriculum they have given an honourable place to the systematic teaching of midwifery, and I trust that it will never come about that they will have to sacrifice this feature.

I am one of those who believe with the whole heart in the outstanding importance of the systematic lecture as an essential part of medical teaching. Properly used, it is an essential, perhaps the most essential, method of scientific teaching. Though it may have arisen at a time when books were few and costly, it holds its own against books, and it takes a place which no book can fill; nay, more, the more that books increase and multiply, the more definite does the value and function of the lecture become, the more is its place and purpose determined and defined. For there can be no doubt that it is utterly impossible for a student, in the time at his disposal, to get from books, however carefully designed they may be, the proportionate conception and knowledge of any subject, such as medicine, midwifery, or surgery, which can be imparted to him in a well-arranged, well-digested course of lectures by a master of the subject. Such a course can only be given by one who already possesses a sound knowledge of the subject he would teach—a knowledge which can only be got by extensive study and a large experience. Such a one can place the subject in a true perspective. He can seize upon principles, shake them free of adventitious details, and present them with a vividness which cannot fail to impress. Moreover, he is not confined to the use of words merely; he can demonstrate by model, by specimen, by experiment; he can appeal to the ear and to the eye at the same time. Then the influence of the living voice must be kept in mind; the

impressiveness of the actual personality of the lecturer is of enormous importance, and the earnest voice and manner can inculcate a fact or principle in a way which no elaboration of type or illustration can approach.

So far, then, as the systematic instruction is concerned, we may assume that the training of our students might be put, without much difficulty, on a satisfactory footing.

But the systematic course is only one part (though an important one) of a proper course of instruction in any such subject as medicine, surgery, or midwifery.

Not less essential is the practical training which is necessary, in order to enable him to apply with success the results of his systematic knowledge. What, then, have we to say regarding the practical training in midwifery which is provided for the Scottish student? Let us see what demands are made on him.

Before he can present himself for a degree, he must show certificates of having either attended twelve cases of labour on his own account; or else that he has managed six cases of labour, and attended the practice of a maternity hospital for three months.

Suppose he takes the former alternative, what has he learned from it? Not much, I fear. It may be that, though he has attended the summons with all expedition, he may have arrived on some of the twelve occasions after the event is completed, and his function is limited to certain inquiries which are now of a purely historical interest. And even had he been present at them all, what has he gained by it? He has not seen one of them conducted by any one more competent than himself. He has never been shown how to prepare a patient for examination; far less, how to examine, or when to examine—*he has not even been shown how to wash his hands!* If he is of an observant turn, he may have attained some knowledge of the phenomena of labour; but as to how to regulate the process, or how to determine when the process requires regulation, he has learned nothing. In fact, at the end of his course of practical training (save the mark!) his proficiency as an obstetrician is comparable to that of a physician who has listened to a lecture on heart disease, but has never listened to the heart. They are both equally incompetent,

but the former is ten times more dangerous! For if, by the mercy of Providence, his twelve cases survive, he may readily conclude that he was the chosen agent in their recovery. He thus begins his course in blundering ignorance, and he ends it in fatuous assurance.

What would our surgical and medical friends say to a proposal to train their students, not in the wards or theatres of the Infirmary, by watching the practice of skilled teachers, but by each student on his own account applying, as best he could, to the wants of the patients in their own houses, the principles laid down in the lecture room?

But suppose, on the other hand, that the student takes advantage of the alternative course open to him — namely, to attend six cases of labour, and to follow the practice of the Maternity Hospital for a term of three months, he has certainly made the wiser choice.

And I should like to take the opportunity of recalling the great obligation that our School of Medicine owes to my friend and master, Dr Halliday Croom, who was the first to institute a course of clinical midwifery in the wards of the Royal Maternity Hospital. To Dr Croom's enthusiasm we owe the institution of this course in 1878, when he was appointed ordinary physician to that institution; and I well remember the characteristic energy with which he threw himself into the organisation and conduct of the course, and the eagerness and delight with which his teaching was followed by the large number of men who joined his clinique. His example was followed by the other physicians, and for twenty-three years it has been an important and integral part of the teaching of practical midwifery in Edinburgh. I do not think it is possible to overrate the importance of the departure then made, and I do not think that the debt the school owes to Dr Croom has ever been adequately recognised. It is therefore no small pleasure to me, who was one of his earliest pupils, as well as his first resident, to employ some of the last words which I shall address to you as President of this Society, in recalling the fact that the honour of instituting the teaching of clinical midwifery in Edinburgh belongs to Dr Croom.

But important and far-reaching in every sense as this teaching has been, I feel sure that Dr Croom will be the first to admit that mainly owing to the conditions under which it has at present to be carried out, it falls short of ideals. Let us consider how this is. The class meets twice a week at appointed hours, so that twenty to twenty-four hours are put in by the student during a trimestre. By taking advantage of patients who may be admitted a few days before the end of pregnancy, as well as of them who from time to time come for advice during pregnancy, it is possible to train the students with comparative fulness in the diagnosis of pregnancy and the prognosis of labour, so far as that depends on the presentation and position of the fœtus, and on the character of the pelvis, and other conditions on the part of the mother.

It is also possible to consider with fair fulness the phenomena of the puerperium, the involution of the uterus, the process of lactation, and the diagnosis and treatment of the usual abnormalities of the puerperal state. The number of the men attending create some difficulties, but on the whole, men who are anxious to learn, learn a good deal.

But, on the other hand, it is quite impossible to teach in any adequate way the details of the *management* of labour. It is a fact that many students have attended the whole course in the hospital, and have never seen a single case of labour within its walls. It may happen that for the entire period of three months no case of labour may occur on the day and at the time of the clinique, and consequently it is impossible to demonstrate the proper procedure at the most critical and anxious time of the whole process of reproduction. I am not overstating the case when I say that our course of clinical midwifery is thus lamentably inadequate. And as matters stand now, it is so, and it must be so.

It comes to this, then, that the vast majority of Edinburgh students (and as far as I can gather it is the same in most other places) leave Edinburgh without any experience in the proper conduct of labour, normal or abnormal. Very few of them have seen an ordinary labour conducted from start to finish by one competent to demonstrate how little is required on the part of

the accoucheur in the management of an ordinary labour; nor have they been shown with what scrupulous care that little has to be done. Not one in ten has seen the forceps applied, and fewer still have seen any of the other obstetric manipulations or operations.

This, then, is the best that Edinburgh can offer them. It is better than it had to offer twenty-five years ago; but its meagreness in the face of what is required has only to be stated to be obvious.

Can we be surprised if men leave us and go into practice with little or no idea of their responsibilities? Can we wonder if the advances of modern surgery have no counterpart in modern midwifery?

Suppose for a moment that the training of the surgical student were on parallel lines, where would surgical practice be? Suppose, for instance, that the surgical student, after attending his course of lectures, were taken round the wards of the Infirmary, shown the several patients, and taught the details of surgical diagnosis and the after-treatment of surgical operations; but, on the other hand, were carefully excluded from the operation room. Not only is he never allowed to see the operations, but he also is prevented from seeing the preparation of his patient before the knife is allowed to touch him, the equally careful preparation of the knife before it is brought near his patient, and the no less scrupulous preparation of the surgeon before he touches either knife or patient. Could we be surprised if such a student concluded that the really important element in surgery was diagnosis and after-treatment, and that the conduct of the operation was of minor consequence? And that might be the reasonable conclusion of any student after attending our Maternity course.

The question, then, is, How is this deficiency in practical teaching to be remedied? My answer is, By a reorganisation of our Maternity Hospital to an extent which will enable students to obtain as sound a practical training in obstetrics there as they do in practical surgery in the wards of the Royal Infirmary. At the present time there are between three and four hundred women delivered annually in the Royal Maternity Hospital. Were we able to utilise these cases as a means of

clinical instruction, we could practically educate a very considerable number of students. But as the time when these cases are to occur cannot be regulated, we must arrange that the students are available whenever the case is in progress, Obviously, this can only be done if we have the students living in the Hospital, or in a place of ready access to the Hospital. Thus, the first necessity is a students' residence. It need not be a large one; if it is capable of containing twelve students it would probably meet the case. The course of instruction and residence might probably be limited to four or five weeks, so that by this means one hundred and forty students or thereby might receive instruction in the course of the year, and thus, practically, every case occurring in the Hospital could be made available for teaching. This idea is not new, and I feel sure from what I have heard and know of students it would be eagerly taken advantage of by them, and, moreover, once fairly instituted and organised, I am confident it would be a source of revenue to the Hospital.

But, in the second place, if it is arranged that the cases be made available for the instruction of the students, it becomes necessary to provide a competent teacher to impart that instruction; and I feel that at present the organisation of the Hospital does not properly permit of this. Most of you are aware that the administration of the Maternity Hospital undergoes, no less than four times a year, a cataclysmic disruption. On the last days of November, January, April, and July, the entire medical staff, including the ordinary physician, the assistant physician, two resident physicians, and twelve or fourteen nurses, retire from duty, and on the following days a new ordinary physician, a new assistant physician, two new residents, and twelve or fourteen new nurses assume administrative charge. The only members who are retained are the staff nurse and her assistants.

Is it a matter for surprise that under these conditions the first few weeks of a quarter is a time of hourly anxiety to the ordinary physician on duty? When one considers the untold possibilities of disaster which may spring from the inexperience of two young graduates and the ignorance of twelve untrained nurses, one can, in a measure, realise what that anxiety is.

I cannot help thinking, and I have thought much on the matter, that the periodic disturbance of the routine of the Hospital accounts for the regrettable fact that our results are not equal to that of many maternity hospitals elsewhere. How can it be otherwise? It is a physical impossibility for either the ordinary physician, or the assistant associated with him, to be present at every labour during these early weeks; and it is as impossible, unless one is there, to guard against the errors of inexperience, carelessness, or ignorance.

I venture to think that a simple solution of the difficulty would be found by appointing a permanent resident physician, whose duty would be to act under the direction of the members of the honorary staff, according to their service, but who in their absence would take the medical direction of the Hospital.

As each physician came on duty he would appoint a junior resident physician, and it would not be difficult to apportion the duties of these two. The senior would take the charge of the indoor cases, and be responsible for their management and after-treatment; while the supervision of the general outdoor practice would fall to the junior. Further, the teaching of the students in the Hospital would form part of the duty of the senior resident. These students, living in or near the Hospital, could be summoned to every case of labour at his discretion, and every case would then be made available for the teaching of practical midwifery.

But more than this, we have to keep in mind that there is a large out-patient practice in connection with the Hospital, amounting to something like eight or nine hundred cases a year. Under such a scheme as this it would be the duty of the junior to visit as far as possible every case of labour, whether normal or abnormal, along with the students. By so doing he would contribute in no small measure to the training of the students, for not only would he aid them in recognising the occurrence of abnormalities and in determining the proper time for interference, but he would be able to show them how to make the best of untoward circumstances in the management of labour—in fact, to conduct a labour to the best purpose in the homes and amid the surroundings of the poor, away from the more ideal conditions and conveniences of the labour ward. By some

such scheme as this I feel that not only would the training of our students in practical midwifery be brought to a state of comparative efficiency, but the gain to the administration of the hospital would be enormous.

Even at this late day there may be some who would suggest that such a scheme was conceived entirely in the interest of the students, and that the real purpose of the Hospital, the succour of women in labour, was made secondary to this.

It is sufficient answer to such criticism to point out that experience has always shown that everything which tends to improve the teaching efficiency of any hospital tends directly to the benefit of the patients treated there.

It is indeed certain that the first thing which will enhance the value of the Maternity Hospital as a succour for a woman in labour is to increase its efficiency as an institution for the teaching of practical obstetrics.

Gentlemen, I have, I fear, presumed on your kindness on this my last appearance as your President, and taxed your patience and forbearance; but I feel sure that there is no one here to-night who does not realise the gravity of the problem which we have to face, in discovering, at any cost, the means by which we may diminish the melancholy sacrifice of life which overshadows the practice of our art to-day. Conscious as I am of the inadequacy of the treatment at my hands, both of the problem and its solution, I venture still to hope that the words which I have spoken, last year and to-night, with all the earnestness of which I am capable, may serve to direct the practical attention of this and similar societies to the questions raised.

I feel sure that it is to bodies such as this, composed as these are of hospital physicians, teachers of obstetrics, and practitioners of the obstetric art, that we must appeal, for in their hands is the key of the problem.

It is in this spirit that I venture to bring before you these suggestions towards the improvement of the teaching of obstetrics in Edinburgh, and I am grateful for the opportunity which your kindness has given me to place my thoughts before you, however inadequate they may be, to the overwhelming importance of the subject. And may I, in the words of John

Milton, exorcise the ghost of despair which sometimes haunts us, seeking to paralyse us as we grapple with such problems:

> "Accuse not Nature, she hath done her part,
> Do thou but thine."

I have said that I accepted the honour of this Chair with diffidence; I resign it to my successor with perfect confidence. I feel sure you have done wisely on this occasion in looking outside the ranks of specialists for your President. It is particularly appropriate that in a society such as ours we should bestow our chief honour, from time to time, on one engaged in general practice. No one is more interested in practical obstetrics than the general practitioner, and we must not forget that the Society was founded by a group of general practitioners for the discussion of matters of obstetric interest arising in their several experiences.

This being so, you have found in Dr James Ritchie one who is in all respects worthy to fill this Chair. He has been for many years a Fellow of the Society, and has served it faithfully in several official capacities. He has further shown the keenest interest in our meetings, has made contributions to our debates of the greatest interest, and he has enriched our *Transactions* by papers of the utmost scientific and practical value. I venture to hope that one feature of his tenure of office will be an increased and active interest in the work of the Society on the part of practitioners generally.

I resign this Chair to Dr Ritchie, in the full assurance that he will worthily uphold and continue its honourable traditions.

Professor Simpson, in proposing a vote of thanks to Dr Milne Murray, said—We cannot let our President leave the Chair without expressing our sense of indebtedness to him for the zeal, energy, and ability with which he has fulfilled his duties. Dr Milne Murray has been an ideal President. His address, with which he has closed his service, adds greatly to the value of all his other services. His touching reference to the Fellows who have left us dwells in all our hearts. With regard to Dr Foulis, it is pathetic to find that, just at the last, the Germans, who, for a quarter of a century, controverted his

ideas as to the mode of development of the Graafian follicle, now recognise and acknowledge the merit of his work and the truth of his observations. Dr Milne Murray has touched on things of the highest importance to the whole profession, present and to come. With regard to his suggestion as to the wider teaching of obstetrics, it is not a new idea to have obstetrics separated from gynæcology, and the latter elevated to the dignity of a special Chair. I made the suggestion myself many years ago, and have again to say that when we were asked to formulate ideas as to how the money from the Carnegie Fund should be put to the best advantage, I said that I considered that the most pressing need of this University was a Chair of Gynæcology. There would be difficulties in the arrangement—*e.g.* as to whether there should still be six months of obstetrics in winter along with three months of gynæcology in summer; or if some better arrangement could be devised. What I would like to say is this, that as the Carnegie Fund is to be drawn upon in all directions for all sorts of things, and some Fellows will have noticed that Lord Elgin in Glasgow recently said that when the Trustees came to administer the funds they would first consider the demands from those in whom they saw a willingness to do something themselves. All those interested in this subject of seeing gynæcology elevated to its proper position would get it all the sooner if they could say that they could see their way to giving any help towards the endowment of the Chair. It is very important from time to time to have a dream set before us, and Dr Milne Murray has set before us a beautiful vision of what might be, and we would endorse almost all he has said as to the direction of improvement in the whole of the Edinburgh Medical School. I do not wish to discourage dreamers, but to give a note of warning that we shall need to do a good deal ourselves if anything is to come of it, and I am sure all of us will be willing to help in the development of the branches of midwifery and gynæcology. Edinburgh, in practical midwifery, has this drawback, that it has a very limited clientele. Dr Milne Murray has said that so many deliveries take place in the Maternity Hospital, but I am sure that all these cases would not be available for teaching. He has, however, done well to set before us so high an ideal, and we thank him for the

manner in which he has fulfilled the duty of President, and for giving us this most stimulating and interesting address to-night.

Dr Berry Hart said he had much pleasure in seconding the vote of thanks to Dr Murray. He did not think that they should allow the address to pass without further notice, but that it should be remitted to the Council to report as to the way in which Maternity teaching could be improved. There was much room for improvement in it. The fresh changes every quarter were very trying, and a man of greater experience was needed in the hospital as resident physician. A resident house for students could easily be arranged, if they were determined about the matter. Another point was that the quarters at the Infirmary clashed with those at the Maternity Hospital; and thus, perhaps, a good man whom one wanted to take a quarter at the Maternity, would say he was unable to come because he was "going on" at the Infirmary. There should be some effort made to make an arrangement by which the end of the Maternity quarters should coincide with those of the Infirmary six-monthly changes. He only threw this out as a suggestion.

Dr Milne Murray thanked the Society for the kind reception of his address, and especially Drs Simpson and Berry Hart, for the kind words they had used in proposing the vote of thanks which the Society had so kindly given. It would certainly be a great pleasure to him if any practical outcome followed his address to-night, on the lines suggested by Professor Simpson and Dr Berry Hart.

Dr James Ritchie, the new President, on taking the Chair, said—Ladies and Gentlemen, Fellows of the Edinburgh Obstetrical Society, I thank you very heartily for the great honour you have done me in placing me here. I must acknowledge that I feel borne down by a sense of diffidence and doubt as to my fitness for the post. I must say little about the doubt, lest I should seem to speak slightingly of your wisdom in placing me here. As to diffidence, I have no doubt about that, especially in consideration of the able and illustrious men who have preceded me. The last general practitioner who was President was Dr Alexander Ballantyne, of Eskbank.

He filled the Chair very ably. By the step which you have now taken, you acknowledge that a hard-working general practitioner is not an unimportant element in the Society. Our retiring President has explained why it should be so. In his address, Dr Milne Murray said that he left the Chair while the Society was in vigorous health. It is a cause for rejoicing, but it also places a considerable amount of responsibility on your shoulders as well as on mine. There is no such thing as standing still. I hope the after history of the Society will be one of progress, and I call upon all the Fellows to resolve from now onwards that they will do their best to further its interests and progress. It is not every one who can carry on original research, but all of us can bring forward cases of difficulty or peculiarity that occur in everyday practice. Though these may not at first sight seem to be of much importance, yet I have no doubt they will all be interesting to us. The cases you find interesting as general practitioners will be of interest to other Fellows. I hope you will all do the best you can for the progress of our Society. It shall be my constant endeavour to further its interests.

V. THE NATURE OF THE TUBEROSE FLESHY MOLE (*Syn.:* FLESHY MOLE; TUBEROSE SUBCHORIAL HÆMATOMA OF THE DECIDUA).

By D. BERRY HART, M.D., Obstetric Physician Royal Maternity and Simpson Memorial Hospital; Gynæcologist to the Royal Infirmary, Edinburgh; Honorary Fellow of the American Gynæcological Society; Lecturer on Midwifery and Diseases of Women, School of the Royal Colleges, Edinburgh.

THE tuberose fleshy mole, often termed shortly the fleshy mole, is a most striking form of abortion, and is second in interest and importance to the hydatid form alone. Its external appearance is not only characteristic, but the specimens are remarkably similar to one another in many respects. Thus, the period of gestation at which the condition occurs (second to third month), the size of the mass expelled, and of the placental portion, the characteristic elevations below the chorion, are

FIG. 1.—AMNIOTIC SURFACE OF A SPECIMEN OF TUBEROSE FLESHY MOLE, WITH EMBRYO (NATURAL SIZE).

There are six tuberose projections. The embryo is 11 millimetres long.

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almost invariably the same in all the specimens, and suggest to one's mind that there must be some definite mechanical cause bringing about such similarity.

Naked-Eye Anatomy of Specimens.

The most common form of tuberose mole is that of a thickened, fleshy-looking structure averaging 6 cm. by 6 cm. in diameter, and 1·5 cm. in thickness. It is evidently placental in nature, with a rough, shreddy aspect, the one attached to the uterus, the opposite surface being, of course, amniotic. The amnion is separable, as usual, from the chorion beneath.

The chorionic surface presents a very remarkable appearance, as it has on it a number of finger-tip-like projections, and these average from five to six in number. On section the structures seen are amnion, chorion, with the subchorionic projections already mentioned, whilst clotted blood makes up the main mass of the thickness, resting usually on a thin layer of serotina. The subchorionic projections contain blood-clot communicating with the rest of the mass, but some of them may be empty. This form of specimen is, thus, early placenta *minus* the membranes attached to the edge (Fig. 1).

Sometimes the tuberose mole is expelled as a pear-shaped mass made up of placenta and reflexa. When laid open, a small fœtus is often found; in the former variety it is less frequently present. The specimens are quite fresh as a rule, and with no odour. This description is based on an examition of five specimens in my possession, and of those figured by Breus, Granville, Walther, Gottschalk, Neumann, Micholitsch, Davidsohn.

Clinical Features.

These are quite distinctive. The patient has the symptoms of early pregnancy, and then of threatened abortion during the second or third month. She usually imagines she has escaped miscarrying, but the uterus does not increase in growth; she remains amenorrhœic, and finally expels such a mole as described above, five, six, eight, eleven, or even eighteen months after conception.

The case may be exceedingly puzzling, but a consideration

of the whole facts should lead to a correct diagnosis. One may, however, not make out the first case one meets with. The knowledge of the long retention of such specimens should also make one refuse to express any opinion as to the chastity of a woman who has expelled such a mole, and whose husband has been absent for a longer period than three months.

The *history*, from the medical attendant's point of view, will therefore probably be as follows:—He is called to a threatened abortion at the third month, and believes he has arrested it. No fresh discharge occurs, and the patient and he will agree that her pregnancy is progressing normally now. After a time, however, she will notice that her abdomen is not increasing in size; and when the medical man is again consulted, he will find, on bimanual examination, the uterus still the size of a two or three months' pregnancy. If he diagnoses subinvolution of the uterus, and puts down the amenorrhœa to accidental cause, the ultimate expulsion of the mole will clear up his ideas.

Views of Previous Observers.

Breus (1892) was the first to write at length on this subject, and his monograph is an important one. He describes carefully the clinical features and pathological anatomy of five cases, and states his views as follows:—He believes that cases like the ones described form a class by themselves, and he terms the condition, "tuberose subchorial hæmatoma of the decidua." He holds that the primary link in the chain is the death of the embryo from some undetermined and varying cause. The fœtal membranes, he believes, continue to develop for a time. The amnion and chorion he holds to be nourished by the maternal blood. The membranes will thus increase in area, and, as the amniotic fluid is small in amount, the amnion and chorion will be thrown into folds. These folds are thus preformed, and become filled with blood when hæmorrhage and ultimate abortion occurs.

Walther (1892), Brösin (1896), and Delbanco (1896) have also described cases.

Neumann (1897), criticising Breus' views, describes eight cases where similar subchorionic protuberances existed with

older fœtuses; he criticises rightly the view that the amnion and chorion grow after fœtal death. The largest embryo in Breus' cases was 17 mm. long, but Neumann had in his specimens fœtuses of 2·5 cm., and even 10·5 cm. long. He urges that the subchorial hæmatoma of Breus is not a special form, but merely a fleshy mole, and cannot be separated from it. He urges that the protuberances arise from subamniotic blood-gushes, and that these, and not the death of the embryo, are the primary cause, and that the membranes do not grow after the death of the embryo. He holds, finally, that the fleshy mole can occur at various periods of pregnancy. Breus has replied hotly to this criticism by Neumann, and the latter has again restated his views. Breus urges that eight of Neumann's ten cases are not fleshy moles, and are thus not available for criticism of his views.

Gottschalk (1899) inclines to Breus' views, but states his belief that the early chorio-villous capillaries are not present, and thus the embryo dies after the yolk-sac has become atrophied. The further changes he gives as Breus does.

Davidsohn (1901) distinguishes between a blood mole and fleshy mole as follows:—In the blood mole the tissue of the ovum is destroyed and replaced by blood-clot; while in the fleshy mole the blood effusion is of an older date, varies in colour, and may form a solid, compact mass. He regards Breus' subchorial hæmatoma of the decidua as differing from these both in result and clinically. This form of mole is never more than the size of a fist, has its characteristic tuberosities, and is retained for several months *in utero—i.e.*, the woman's amenorrhœa is prolonged, and the apparent two to three months' pregnancy is quite out of proportion to the often large number of periods missed. Davidsohn gives a good summary of the various views, considers Gottschalk's theory untenable, and passes on to consider his own two cases, where he made a careful microscopical examination. The important part is his description of the compact layer of the basal serotina,[1] which he speaks of as retaining its characteristics,

[1] The basal serotina or decidua basalis is the ordinary serotina; the reflexa in the decidua capsularis.

although the decidual cells are smaller, while at some points it is necrotic or infiltrated with blood and lime-salts. In his second specimen he speaks of the basal serotina as totally necrotic—"Die Decidua basalis ist total necrotisch." He makes the important statement that the chorion is not devoid of blood-vessels, and this, of course, is against Gottschalk's hypothesis. He himself urges that a primary hydramnios gives the explanation of the condition.

I have now only to add, to complete this summary, that in 1899 I accepted Breus' view as to the primary death of the embryo, but withdraw that adhesion now, owing to my ascertaining some conditions to be described presently; and that Fothergill, in the same year, drew attention to the part decidual cells play in causing absorption of villi—"Decidual cells destroy fœtal epithelium and organise blood-clot."

Micholotisch (1901) has also described a case of mole with the additional rare condition of some hydatiginous degeneration of the chorionic villi. The drawing appended to his paper shows the condition well.

I now wish to consider the nature of the tuberose fleshy mole so far as my own specimens are concerned, and begin by discussing—

Normal Placental Structure in its Bearings on the Changes in the Tuberose Mole.

I take this up as follows:—

1. *General architectural structure of the placenta; the intervillous circulation.*

2. *Physiological thrombosis of the sinuses in the basal serotina and uterine wall.*

3. *Structure of villi.*

I here take up what may be termed the architectural features of the placenta, and conveniently for this purpose we may study the schematic drawing Leopold gives of its structure in Plate XXX. of his atlas, *Uterus und Kind.* We see there the placenta made up of amnion and chorion, the latter sending off abundant villi, which touch the basal serotina with their tips. The maternal blood flows round these villi in the intervillous spaces (Fig. 2).

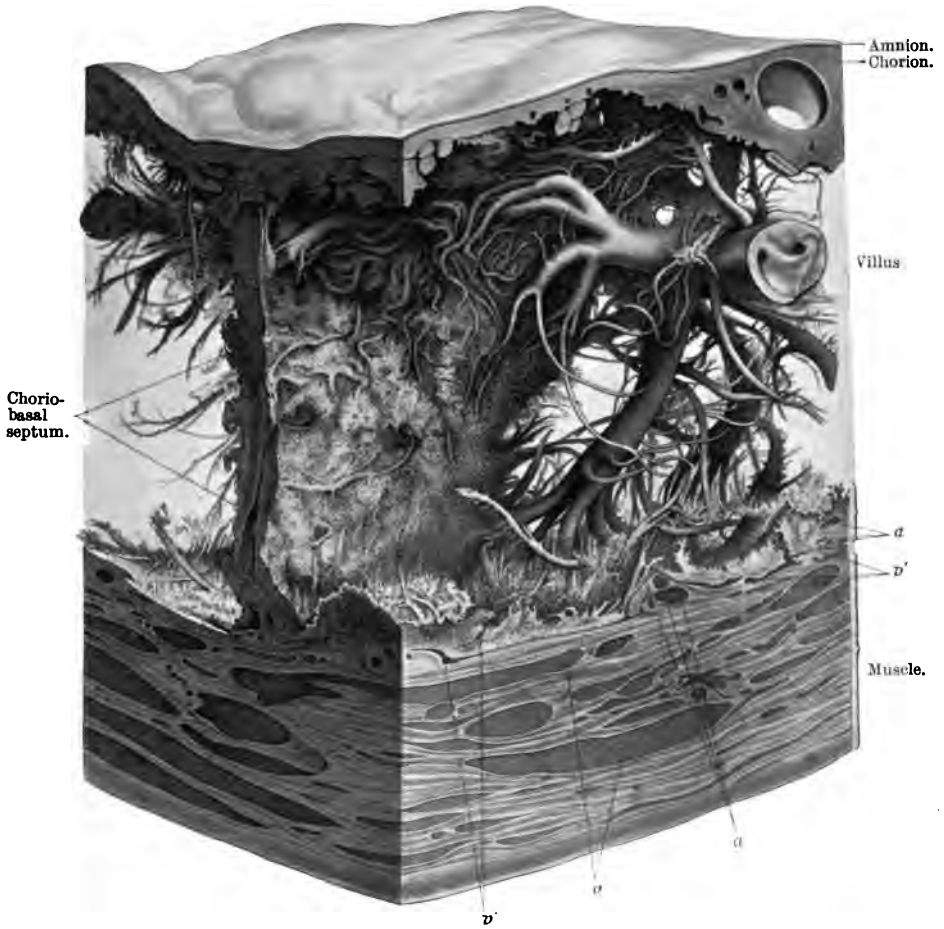

FIG. 2.—STRUCTURE OF FULL-TIME PLACENTA (LEOPOLD).
a = Serotina. Note relations of vessels to serotina.

[*To face page* 32.

The basal serotina sends processes towards and up to the chorion. These we may term "septa cotyledonis" or "chorio-basal septa." The blood-vessels bearing maternal blood to the intervillous spaces pass up these septa and open on the free lateral surfaces of the latter, while the maternal blood is returned from the intervillous spaces by vessels whose mouths open on the free surface of the basal serotina between the bases of the chorio-basal septa. The free surface of the basal serotina is the large-celled layer, and nearer the uterine wall is the spongy layer where the tuberose mole usually separates and is cast off. In the former, one sees sections of blood-vessels, thin-walled and venous or arterial. They are difficult to distinguish, unless one keeps in mind Waldeyer's points of difference (see these at p. 33 of his paper, and also in Minot's *Embryology*, p. 372).

The special points thus to be noted are as follows:—(*a*) A certain number of the chorio-basal septa unite the basal serotina and the chorion; (*b*) blood flows into and out of the intervillous spaces, passing through the basal serotina; the marginal sinus also returns blood from the intervillous spaces (sinus of Meckel).

2. *Physiological Thrombosis of the Sinuses in the Basal Serotina and Uterine Wall.*—Friedländer was the first to point out that during and after the eighth month of pregnancy some of the sinuses in the uterine wall below the placental site become blocked. He believed this to be due to an accumulation of granular cells in the sinuses, to blood-clotting, and to the development of young connective tissue.

Leopold next showed that the same condition was present in the serotina about the end of pregnancy, and confirmed Friedländer's observations. He believes, however, that the condition is produced by wandering cells passing through the sinus walls. Gulland and the writer, however, found the same conditions present in the pregnant uterus at the seventh week. In the compact layer of the serotina were found venous sinuses where the endothelium lining them was beginning to proliferate, while others were blocked entirely with young connective tissue.

3. *Structure of Villi.*—I do not consider this fully at present. but point out that the villi possess a core of myxomatous tissue (mesoderm), with a double or triple layer of epithelium outside

(ectoderm). The villi are thus somatopleuric processes, and are bathed in the maternal blood. Gulland and I also pointed out, that where the tips of the villi touched the basal serotina, phagocytic action was going on, with absorption as its result, and thus a degeneration layer was formed, which I had previously noted in the third-stage placenta.

Microscopical Anatomy of the Tuberose Mole in the Author's Specimens.

For this purpose I examined three specimens by the celloidin method, as the sections are brittle, and apt to break when the ordinary paraffin procedure is followed. The part examined was large enough to give the lateral boundaries of the characteristic tuberosities developed beneath the chorion.

On examination, the sections of two were found to include the structure from amnion to the large-celled layer of the basal serotina, so that the specimens had separated at the spongy layer. The parts shown are therefore amnion, chorion, villi, and intervillous spaces, with the large-celled serotinal layer.

The amnion and chorion are well preserved, and call for no special remark. The amnion is naturally a tough, elastic membrane, and both are away from phagocytic action. The intervillous spaces are occupied with effused, clotted blood, in which one can see scattered decidual cells and villi, both much altered, and recognisable more from their outline than from their structure.

A very important point is that at the sulcus bounding the base of the characteristic chorionic tuberosities, already described, one can see a chorio-basal septum persisting, but with a curved outline, instead of the normal straight one already described (*vide* Figs. 3 and 4).

In the large-celled layer very evident changes are present. One can note villi in various stages of absorption, some with epithelium fairly intact, others with it completely absorbed, and only the core left. The most important feature is the blocking of the thin-walled sinuses, whose lumen is invariably blocked with organised connective tissue. With care they can be distinguished from villi, and some are especially easy to pick out, owing to their curved outline (Fig. 3).

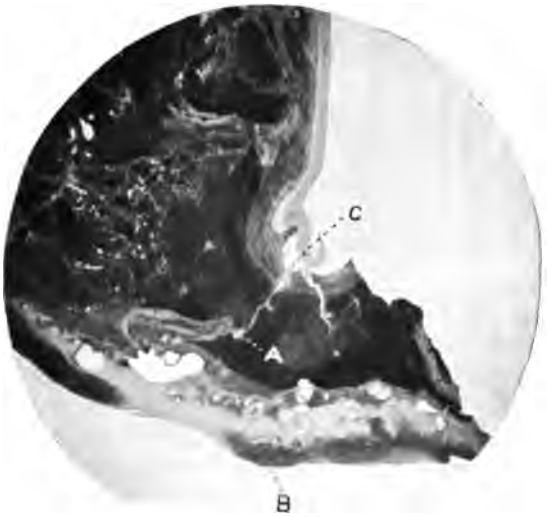

FIG. 3.—FROM MICROPHOTOGRAPH OF SECTION AT EDGE OF TUBEROSE SWELLING (C).

A, Chorio-basal septum, bulged; B, serotina, with thrombosed sinuses and villi. The dotted line at C passes through amnion.

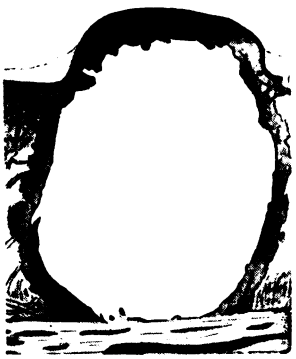

FIG. 4.—DIAGRAM TO SHOW RELATIONS OF SEROTINA, CHORION WITH AMNION, AND CHORIO-BASAL SEPTA IN TUBEROSE FLESHY MOLE.

The amnion and chorion, with tuberosity, are above; the serotina is below, and the two bulged vertical chorio-basal septa are seen joining serotina and chorion.

[*To face page* 34.

The view my preparations indicate seems to me to be the following:—

1. There is an undue blocking of the serotinal sinuses in the large-celled layer. This leads to—

2. A slow engorgement of the intervillous circulation. This will bulge out the chorio-basal septa, and as these tack down the chorion at definite points, the amnion and chorion will bulge up between. This produces the tuberose swellings (Figs. 3 and 4).

3. The embryo dies as the result of this interference with the circulation, and its death is "secondary."

4. The placenta becomes a thrombosed mass, and is retained a certain time before expulsion.

I agree with Breus that the tuberose fleshy mole is a distinct form of fleshy mole. I differ from him in that I make the death of the embryo secondary and not primary. The primary link in the chain of events is the excessive clotting in the serotinal sinuses from a cause as yet unknown; then follow the other stages I have described.

Literature.

Breus—*Das tuberöse subchoriale Hæmatom der Decidua. Eine typische Form der Molenschwangerschaft*, Leipzig und Wien, 1892.

Davidsohn—"Zur Lehre von der Mola hæmatomatosa," *Archiv für Gynäk.*, Bd. lxv., Heft 1.

Fothergill—"On Fleshy Mole," *Brit. Med. Jour.*, 1896, ii.

Friedlander—*Physiologisch-anatomische Untersuchungen über den Uterus*, Leipzig, 1870.

Gottschalk—"Ueber einen Fall von sogenanntem subchorialen tuberösen Hämatom," *Zeitsch. für Geburts. und Gynäk.*, Bd. xl., 1899.

Granville—*Graphic Illustrations of Abortion and the Diseases of Menstruation*, London, 1834.

Hart—"Nature of Fleshy Mole," *Brit. Med. Jour.*, October 24, 1896.

Hart—*Selected Papers*, W. & A. K. Johnston, Edinburgh and London.

HART and GULLAND—"Structure of Human Placenta," *Edin. Obst. Trans.*, vol. xvii.

LEOPOLD—*Uterus und Kind*, Leipzig, 1897; also, *Studien über die Uterus-schleimhaut*, Berlin, 1878.

MICHOLITSCH—"Ein Fall von Breus'scher Hämatommole mit blasenähnlicher Degeneration der Chorionzotten," *Archiv für Gynäk.*, Bd. lxv., Heft 1.

NEUMANN—"Das sogenannte tuberöse subchoriale Hæmatom der Decidua," *Monats. für Geburts. und Gynäk.*, Bd. v., s. 108; see also pp. 522 and 623.

Professor Simpson—I have listened with great interest to this communication. This is not the only kind of fleshy mole; this is the tuberous one. It is very interesting, the way in which Dr Berry Hart has worked out the manner in which these tubercles form, as they project themselves into the interior of the amnion. He admitted that there was still something left for observation as to how the vessels get blocked. We can understand how a vein becoming plugged blocks the outlet from that sinus, and blood keeping pouring in causes this distension. I would suppose that blocking of the vein must be preliminary. Observations of this sort are extremely interesting and valuable. I would like to know, when Dr Hart says that the decidual beams thus passing from the uterine surface to the chorion are alone affected, what about the attachments of the villi? Are they torn off? (*Dr Berry Hart*—Specimens show a good many villi scattered in the blood.) I think Dr Hart has clearly established his position that Breus made a mistake in regarding the infolding of the amnion as primary. I think it much more likely that the blood poured into the sinus, distending it, and causing it to project permanently after the blood, consolidated. The great difficulty is to know how this mode of blocking of the different veins takes place. Dr Hart says that the fœtus is generally dropsical. In some of the specimens I have seen there was still a considerable quantity of liquor amnii, but the embryo was destroyed.

Dr Haultain wished to ask Dr Hart if his definition of fleshy mole was limited to cases in which the placenta had

been formed, because there were cases where you had the so-called fleshy mole in which the ovum had probably been cast off or blighted very early, and where the entire mucous membrane of the uterus was thickened, and had undergone changes of degenerative and connective-tissue formation within it. Under these circumstances we would not find villi situated as in the placenta. And one finds cases in which the ovum had been cast off at perhaps the sixth or eighth week; following that, from one to three months afterwards, perhaps, there was a large decidual mass passed. He assumed that form was also a variety of fleshy mole, which is not placental. He would like to know if Dr Hart would limit carneous moles to placental formation.

Dr Berry Hart thought it would be better, according to Professor Simpson's suggestion, to make the title of the paper, "The Nature of the Tuberous Fleshy Mole."

Dr Milne Murray congratulated Dr Hart on his paper, and thought his explanation was very simple, and that it was probably correct. There was one mechanical detail in which he did not quite follow him. How does he fill in the places between the sinuses? He presumed that there were various segments that were not involved, and there would be a space left. How is this filled up? He considered Dr Hart's explanation to be much to the point, and to clear up the difficulty of previous ideas.

Dr Ritchie—Did I understand Dr Hart to say that the normal condition in the early stage is to find certain of these decidual sinuses blocked up? It seems an extraordinary statement. Does he adduce an argument from this?

Dr Berry Hart—What causes the closing of the sinuses is not settled, but there is a normal plugging of these veins.

Dr Ritchie—If this occurs in one, why does it not occur in all?

Dr Berry Hart—It occurs only to a certain extent in normal cases, but all are plugged in fleshy mole.

Dr Berry Hart thanked the Fellows for their kind remarks upon his paper.

MEETING II.—DECEMBER 12, 1901.

DR JAMES RITCHIE, *President, in the Chair.*

I. The following gentleman was elected an Ordinary Fellow of the Society:—David A. Callender, M.B., Ch.B., 180 Ferry Road, Leith.

II. *Dr Berry Hart* showed—(*a*) A LARGE FIBROID, which had burrowed between the layers of the meso-rectum. (*b*) TWO TUBERCULAR KIDNEYS, one removed by abdominal section, the other by lumbar nephrectomy. (*c*) AN OVARIAN TUMOUR, with twisted pedicle.

III. *Dr Milne Murray* showed—(*a*) TWO EARLY CHORIONIC SACS. (*b*) THE ENTIRE GESTATION SAC from a case of placenta prævia at the seventh month of pregnancy.

IV. *Dr Lamond Lackie* showed—OVARIAN TUMOUR, with twisted pedicle.

V. *Dr Haultain* showed a UTERUS AND APPENDAGES, removed abdominally for hæmatometra, the result of absence of the vagina. The patient was aged 22 years, and married nine months. Six months previously attempts had been made to make a vagina, but failed on account of want of space between the rectum and bladder. At that time the uterus was not distended. Two months ago she was seized with great pain in the abdomen, which lasted three or four days, and recurred with increased severity twenty-eight days after. At this time, on examination, she showed the hall-marked signs of hæmatometra, and so removal was undertaken. On opening the abdomen, the peritoneal cavity was found to contain about two quarts of dark-brown serous fluid. The uterus was greatly distended in its lower uterine segment, while the body was distended to a minor degree. The Fallopian tubes were normal and pervious, and blood could be seen issuing from their abdominal extremities. The ovaries were both enlarged to the size of Tangerine oranges, as the

result of the formation of several blood-cysts in each. The intraperitoneal fluid was undoubtedly due to the regurgitated blood from the uterus, mixed with serous peritoneal exudation.

VI. A CASE OF SPONTANEOUS RUPTURE OF AN APPARENTLY NORMAL UTERUS AT THE COMMENCEMENT OF LABOUR.

By R. MILNE MURRAY, M.A., M.B., F.R.C.P.E., Physician to the Royal Maternity Hospital, Assistant Gynæcologist to the Royal Infirmary, Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

RUPTURE of the uterus during pregnancy and parturition is happily a comparatively rare occurrence.

In certain instances we can recognise the conditions which are likely to predispose to rupture, in others we can detect the signs of threatened rupture, and thus we can, in a number of cases, exercise a salutary prophylaxis with the best results.

Further, though cases arise from time to time in which no opportunity for preventive measures is given us, the resources of modern surgery encourage us to interfere, even in apparently desperate circumstances, and not infrequently this boldness is amply justified.

It may, I think, be safely said that the occurrence of a case of rupture of the uterus in the hands of an obstetrician is, in the great majority of cases, a reproach to him and a slight on his art. In most cases the conditions which predispose to it are so obvious, and the signs which precede it are so easily recognised, that, provided the patient comes under observation in reasonable time, the accident should not occur.

But, on the other hand, cases arise from time to time in which uterine rupture occurs under apparently normal conditions, and develops without any premonitory sign whatever. In such cases prevention is of course impossible in our present knowledge, and treatment after the fact is our only resort. If we glance for a moment at a scheme of the commonly accepted causes of uterine rupture, we may better realise the distinction between these two sets of cases.

We may conveniently divide the immediate causes of rupture into—(*a*) Traumatic; (*b*) Spontaneous.

(*a*) *Traumatic.*—In this group we include all cases where the rupture is caused by some direct mechanical violence, such as the forcible introduction of the hand into the uterus, the unskilful performance of the operation of internal version, the improper use of forceps, etc. It need hardly be said that such cases—the result of *internal traumatism*—should never occur.

Under the head of traumatic causes we must also include a small group of cases in which the uterus has ruptured late in pregnancy, apparently as the result of a blow on the abdomen or of a fall—*external traumatism.* Such cases have been put on record by Schroeder (1), Plenio (2), Slavjansky (3), and others. It may be that some of these cases were examples of interstitial tubal pregnancy, and that in them rupture took place in a region thinned out to the point of giving way, and that very little violence was required to determine the rupture. In any case occurring after the fifth month, where the rupture was fundal and where the tube was involved, we would naturally think of this as a possible explanation. In some of the cases recorded this factor has on the other hand been excluded, and some other condition—perhaps a diseased or degenerated condition of the uterine tissue—may have facilitated rupture.

(*b*) *Spontaneous.* — In cases of spontaneous rupture we assume that the immediately determining cause is the contraction of the uterus. The predisposing conditions—those which render the uterus liable to rupture—are various. The great majority of those cases are, however, associated with some condition arising out of an abnormality of either of two of the factors of labour—the passage or the passenger. In the former case, the passage, we may meet with a rigid os or a contracted pelvis; in the latter, the passenger, with a hydrocephalic head or a malpresentation.

Thanks, in the main, to the classic work of Bandl (4), we are familiar with the mechanism by which the process occurs. Given any condition which interferes with or delays the dilatation of the os, the lower uterine segment becomes thinned out, while the muscular tissue of the upper segment gathers itself together into a sort of cap on the upper pole of the uterine

mass. The strain on the thinned out lower segment increases, until it gives way—in most cases not far from the junction of the two segments. A tear so produced will in all cases tend to run across the long uterine axis, though the general direction of the tear may be altered by the splitting produced by the escape of the uterine contents. Thus the developed tear may run obliquely or directly upwards.

If, on the other hand, the thinning out of the lower segment is associated with a contracted pelvis, the position of the rupture may be determined by the grinding of some portion of the thinning segment between the fœtal head and some ridge of the bony pelvis. A contused area may thus be formed in which the rupture may begin, in a transverse direction at first, and end vertically or obliquely, according to circumstances. Or it may be that the point of rupture may be determined by an excessive thinning out of the uterine wall over a prominent point in a malpresentation, such as the chin in a face-case, or the occiput or shoulder in a transverse case.

But, on the other hand, spontaneous rupture may occur in certain cases without any process such as that described by Bandl. There may be no abnormal obstruction to the escape of the contents, the labour may only have begun, and, moreover, the tear may have no special relation to the lower segment, though it may, by extension, involve it too. Three sets of cases may be found in this group:—

(1) Under this group fall some of those cases already referred to, of interstitial pregnancy. No doubt, in most instances, this condition causes rupture at the fifth or sixth month, but a certain number may continue to full time, and the rupture may follow the first labour pain. One of the most interesting of these cases is recorded by Paul Bar and R. Mercier (5). In this case the patient was last unwell on the 8th October, and on the 10th July in the following year the uterus ruptured without any apparent cause. Laparotomy was performed, but the patient died. Careful examination of the uterus showed that the pregnancy involved the right tube. The sac had grown into the uterine cavity, producing a tubo-uterine pregnancy; but apparently the first contraction ruptured the uterus at the junction of the tube and the cornu.

(2) Spontaneous rupture may occur in certain *abnormal* conditions of the uterus, such as the bicornuous uterus, the myomatous uterus, and in the uterus which has previously been the subject of a Cæsarean operation.

One can easily understand the predisposing tendency to rupture associated with the cicatrix of a Cæsarean operation. Krukenberg (6) has collected thirteen cases of women in whom the Cæsarean operation had been performed, in each of whom the uterus ruptured in a subsequent pregnancy; and Rose and Munde record a case in which in four successive pregnancies the uterus ruptured spontaneously.

(3) In the last place, there is a very small number of cases on record in which rupture has occurred at the beginning of labour, in a uterus of normal conformation and in which there is no gross complication, such as a bicornuous state, the presence of a fibroid, or any such condition. Cases of this nature have been recorded by Ingerslev (7), by Hofmeier (8), and by Professor Simpson (9). In the two first cases nothing abnormal in the uterus could be found, and the histological examination revealed nothing which could account for the accident. In Simpson's case the muscular fibre showed signs of fatty degeneration in a marked degree. To this group belongs the case which I now desire to relate.

Early on the morning of the 22nd July last, my friend Dr Moorhouse asked me by telephone to come to Stirling to see a case of rupture of the uterus which had occurred there during the night. Dr Lackie very kindly went with me, and when we arrived, about 10 A.M., I obtained the following account of the case from Dr Moorhouse:—

The woman, aged 27, v.-para, was a patient of Dr M'Nicoll's, and in his absence on holiday she had sent for Dr Moorhouse at 2.30 A.M. She was at that time complaining of severe pain on the left side of the abdomen, and crying out for chloroform and instruments. She had taken a dose of castor oil on the previous day, which had moved the bowels twice. The pain had begun at 11.30 P.M. on the 21st, at a spot half-way between the umbilicus and the left anterior superior iliac spine. She thought the pain at first was due to the castor-oil, as it was entirely in the front. Dr Moorhouse could not hear the fœtal

heart, and he noticed the tenseness of the tumour and its marked deflection to the left side. There seemed to be no contractions sufficient to account for the pain complained of.

Per vaginam.—There was no sign of any presenting part, the finger could not be passed through the os, and the cervix was not taken up. On the presumption that these were false pains, $\frac{1}{8}$ gr. of morphia was given. At 3 A.M. the dose was repeated. By 3.30 the pain had extended over the whole tumour, was more severe, and the patient was continually crying out. There was no change in the cervix. The temperature was 96°, pulse 104. At 4 A.M., on examining abdomen, the fœtal parts could be felt at the upper end of tumour with unusual distinctness. One part, just below the ensiform cartilage, could be seized between the finger and thumb.

Drs Mackintosh and Whytt saw the patient in consultation, and it was thought that it was most likely a case of extra-uterine gestation. The morphia was repeated, and warm fomentations were applied to the abdomen, which seemed to soothe the pain for a little. At 5 A.M. the pain became more severe, the cheeks became flushed, and the eyes sunken. Temperature 97°, pulse 108. At 8 A.M. the patient was removed to the Royal Infirmary, to which she was admitted by the kindness of Dr Mackintosh. She bore the journey well. It was noticed that on lifting her out of bed there were some blood-stains on the bed-clothes. At 10.20 I saw the patient in a side-ward of the Infirmary. She presented the appearance of one in a state of profound collapse. The face was drawn and pallid, the eyes half-closed, and she was only able to answer questions in a dazed fashion and in a whisper. On examination of the abdomen, it presented a curious barrel-shaped appearance, it was extremely tense, and any attempt at palpation caused apparently much suffering. Chloroform was given, and then the parts of the fœtus could be felt with extraordinary distinctness. There could be no doubt that the fœtus was either in the abdomen, or else in a very thin sac. On vaginal examination, the finger could be easily passed into the cervix, which seemed only partially taken up. Beyond the internal os the finger passed into an empty cavity, that of the uterus, and in the left side a rent could be felt, through which the finger entered the cavity

of the abdomen. Through this could be felt the edge of the placenta, and a little beyond the head of the fœtus could be made out. It was thus quite plain that we had to deal with a case of uterine rupture, whatever may have been the cause; and further, it was clear that the uterine contents had entirely escaped into the abdominal cavity.

The pulse was now 120, very feeble at the wrist, and the temperature 96° F. The patient was plainly in a desperate condition, and though the prospects of an operation being successful seemed exceedingly faint, yet it was obvious that it gave her the only chance, though a small one. Accordingly, she was carefully removed to the operating theatre, and the usual preparations for opening the abdomen were rapidly made. On making the incision, which extended from an inch above the umbilicus to within an inch of the pubis, an enormous quantity of fluid escaped, consisting of blood and liquor amnii. I rapidly extracted the fœtus and placenta, both of which were found lying in the abdominal cavity. I then brought the uterus out of the wound. The uterus was firmly retracted, and a tear was found which extended from a point about an inch behind the left Fallopian tube, downwards and forwards, along the border of the uterus to the vaginal roof. Near the lower end of the rent the line of laceration turned somewhat sharply towards the front, and involved the left upper region of the bladder. There was an alarming amount of hæmorrhage going on both from the tear in the uterus as well as from the proximal end of the torn uterine artery. With a view to checking this, I tried to secure the lower end of the uterus in a ligature of elastic tubing. But a difficulty arose which rendered this impossible. It was found that the bladder was situated so high up on the anterior surface of the uterus that any ligature applied near the neck of the uterus would include at least half the bladder. I therefore resolved to remove the uterus. The ovarian arteries were tied on both sides, the bladder was dissected off the anterior wall, and the uterine artery of the right side ligatured. The uterus was then amputated through the cervix. Considerable difficulty was found in securing the proximal end of the left uterine artery. As a matter of fact, there were several large vessels, each of which had to be

secured in separate ligatures, and considerable time was spent at this stage of the operation. At one time I thought it would be necessary to tie the internal iliac artery, as the main trunk of the arteries had retreated so far into the cellular tissue below the broad ligaments that I found it exceedingly difficult to recover it. I next dealt with the rent in the bladder. This was closed by several fine catgut stitches. The edges of the peritoneal folds left by the removal of the uterus were then carefully closed with fine silk. I purposely did *not* stitch the stump of the cervix, as I felt that it was better left open to serve as a drain, on account of the probability of oozing between the layers of the broad ligament.

Up to this time the operation had occupied rather more than an hour, most of the time having been spent in securing the various bleeding points connected with the left uterine artery. The patient had, considering everything, stood the operation remarkably well, but naturally the pulse was showing further signs of flagging, and I was anxious to complete the necessary steps of the operation as soon as possible. For this, as well as for other reasons, I resolved to dispense with any attempt at an abdominal toilette. This may appear to have been a somewhat hazardous omission, seeing that the abdominal cavity contained not only blood, but also the remains of the liquor amnii, a very obvious quantity of meconium, not to mention portions of *vernix caseosa*, with which the child was particularly well provided. My confidence in the capacity of the peritoneum to deal with such matters was, however, fully justified, as the sequel showed. Accordingly, I closed the abdominal incision as rapidly as possible, using through and through silk-worm gut sutures. Before removing the patient from the table, a copious enema of hot saline, containing an ounce of brandy, was given. A 1-60th grain of strychnine was also administered hypodermically, and the patient put back to bed. The temperature was at this time 97° F., and the pulse 135. At 12.30, when I left her, the pulse had gained somewhat in quality, and she had recovered consciousness. At 9 P.M. 16 ounces of urine were drawn off by the catheter, which was a satisfactory evidence that the function of the bladder had been established, and the temperature was 98° F., and the pulse 120.

On the following day the temperature was normal at 8 A.M., and from that day progress was satisfactory and practically uneventful until the twelfth. I saw her on the seventh day after the operation, and found her remarkably well. On the 13th day the temperature rose to 102°·6; on the following day it reached 104°, and on the 16th at 10 A.M. it reached 106°. This was accompanied by a severe rigor, and a few hours later a copious purulent discharge escaped from the vagina. This was followed by an immediate fall of temperature to 96°·4. I saw the patient on the next day. The temperature was again normal. On vaginal examination a boggy soft swelling could be felt in the left lateral fornix, and on pressure upon this a stream of thin sanious pus escaped through the cervix. The explanation of this lies probably in the fact that during the operation the supply of thin silk ran short, and a further quantity was sterilised somewhat hurriedly, and I fear rather imperfectly. Some of this was used in tying the last of the branches of the left uterine artery. This had in all probability become septic, but happily not before the peritoneum had become safely shut off. The resulting abscess was thus entirely extraperitoneal, and it found a comparatively easy exit through the unsutured cervical canal. The discharge continued for several days in varying amount, and the temperature flickered a little, but nothing occurred to give rise to any further anxiety, and the recovery of the patient was afterwards uneventful. She was discharged on the 14th September, and is at the present time in good health.

In considering the details of this remarkable case I find there are some points of interest common to it and the one recorded by Professor Simpson in 1866, and already referred to. In both cases the accident seems to have occurred at the very beginning of the labour; in both labour appears to have occurred at the full time; and in both, on first examination, the cervix was found to be high, flaccid, and undilated. Further, in neither was there any serious external hæmorrhage, while in both the child had escaped entirely through the rent, although in Simpson's case the placenta was still in the uterus when the diagnosis of rupture was made. In neither was the tube involved in the rent. In Simpson's case, "the rent was found

to run up precisely along the left side of the uterus, immediately in front of the broad ligament, from the level of the os internum till within half an inch of the Fallopian tube, where it turned somewhat abruptly forward and upward along the anterior wall, and terminated almost at the mesial line, about an inch below the fundus."

In my case, as you see from the amputated uterus, the rent extends from a point about an inch behind the left tube down the left border, as far as the amputated surface. Beyond this it extended to the junction of the cervix and vagina. The tear in the bladder is not very easily explained. The bladder was abnormally high up, occupying almost three-fifths of the anterior surface of the retracted uterus. The damage to the bladder may have been caused by the escape of the fœtus, a not unlikely possibility if it had been distended at the time. It may, on the other hand, have been caused by the manipulation necessary to withdraw the uterus through the incision, but I think this is less likely, as the wound was free and the withdrawal quite easy.

With regard to the question as to how this uterus ruptured, I can offer no answer. To the naked eye it presents no abnormality. It is not myomatous, there is no sign of a double horn, nor of any other peculiarity. Microscopically, a portion taken from the anterior edge of the tear showed a perfectly normal structure, without any suggestion of a fatty change. In this respect it differs from Simpson's case, in which a fatty degeneration was well marked. Nevertheless, it is almost certain that there must be some obscure change in the quality of the uterine muscle. Apart from this, the accident is to me inconceivable.

In case some light might be thrown on the causation by the previous obstetric history of the patient, I obtained the following notes, by the kindness of Dr M'Nicoll:—

Menstruation began at 15; type, 30 days; duration, 2 days, and quite painless.

First child six years ago; forceps; still-born.

Second child; forceps; still-born.

Third child; forceps; lived one year.

Fourth child; forceps; still alive.

The fourth confinement took place on the 24th April 1900.

She got up on the fifth day. She had no milk. She had little appetite for a time, but this returned shortly, and she made a good recovery. Menstruation took place a month after confinement, and every month thereafter until October. Last period, 25th October 1900.

During pregnancy there was less general disturbance and sickness than in any former one. There was no vaginal discharge, nor anything whatever to suggest the least abnormality.

So far then we can, in the meantime, describe it simply as a case of spontaneous rupture in an apparently normal uterus.

Apart, however, from the question of the etiology of the accident, I think there are some points of interest of a general nature, to which I should like briefly to refer:—

(1) As to the indication for the operation, I am sure it will be admitted that the results of cases such as this justify the performance of laparotomy, where indicated in even extreme degrees of exhaustion and collapse. A better example of this could scarcely be required, if you recall the fact that in this case the rupture occurred at least nine hours before the operation, and that the latter was begun with a subnormal temperature and a scarcely perceptible pulse.

(2) If in any such case I found a similar difficulty in securing the torn ends of the uterine artery, I should try to save time and hæmorrhage by tying the internal iliac. This part of the operation in this instance took more time than all the rest.

(3) I venture to think that I did right in leaving the cervical stump unsutured. Had I closed it in the ordinary way I am sure that the abscess which developed in the second week would have had more difficulty in finding an exit, and the result might have been very different. In any case, where there is a risk of subperitoneal oozing, the open canal would provide an easy means of drainage.

(4) The anatomical peculiarity of the bladder in this case is well worth keeping in mind. If a similar condition were present in any case where a Porro operation was proposed, the bladder would certainly be included in the ligature, if applied in the way usually described. It would be well in all such cases to determine the exact upper limit of the bladder before applying the elastic or other ligature.

(5) And, lastly, as to the "toilette of the peritoneum." In scarcely any detail of the technique of abdominal surgery has practice been modified so much during the last fifteen or twenty years as in the matter of the peritoneal toilette and drainage. During the early eighties almost every surgeon spent much time and anxiety in the so-called cleansing of the peritoneum, and even then, not satisfied with the success of his endeavours, he not infrequently resorted to drainage, either by the glass tube or gauze drain. Endless time and trouble were spent over such fluids as blood, simple ovarian or parovarian fluid; sponge after sponge was inserted into the deep peritoneal pouches, in order to remove every particle. A bystander would have assumed that the most important part of the whole operation was now in progress. One may realise how much stress was laid on this detail, when we read that so distinguished an operator as Kelly (10) drained seventy-three of his first hundred cases. In the intervening years clinical and experimental evidence has accumulated to prove beyond all doubt that the peritoneum is in no way incommoded by the presence of considerable quantities of blood, or the non-septic contents of any abdominal tumour, and that the time spent in trying to remove them is wasted, while the mechanical disturbance produced by the procedure is harmful in a high degree.

Every abdominal surgeon is aware of the fact that the peritoneum is capable of absorbing immense quantities of one variety of the material found in ovarian cystomata, namely, the gelatinous substance so often found in cysts which have ruptured spontaneously. If the sac is removed, it is quite unnecessary to remove the gelatinous material. A few days before I saw the case just described, I operated on a woman of 76. A gelatinous tumour had burst a day previously. I removed the sac, but made no attempt to touch the gelatinous mass. In closing the abdominal wound the stuff oozed out between the sutures, yet the patient made a perfect and uneventful recovery. If any demonstration of the uselessness of "cleansing" the peritoneum of aseptic material was required, the case recorded surely presents it. When we closed the abdomen we included much blood, both fluid and coagulated, no doubt a considerable amount of liquor amnii, and a very obvious amount of meconium.

This had freely escaped from the fœtus, and the whole abdominal viscera were stained a dark green by it. Just as I was about to tie the first stitch, Dr Lackie fished up a piece of whitish matter, which proved to be *vernix caseosa*, and, no doubt, more was left behind. Yet none of these varieties of foreign material seems to have given the peritoneum any trouble. The complication, which began to develop on the twelfth day, was undoubtedly extraperitoneal.

Another case on which I operated, in Ward 36 during Dr Berry Hart's absence in August, is interesting as bearing on the same question. I opened the abdomen in a young woman, to remove, as I supposed, a very mobile ovarian tumour. I found instead that the tumour was a cyst about the size of a small cocoanut, growing from the lower end of the left kidney. I opened the posterior reflection of the peritoneum, and dissected the tumour up to its pedicle without difficulty. The pedicle was short, but, after tying it, I thought I might remove the whole sac with safety by cutting through the pedicle below the ligature. Unfortunately, I left the sac, and the greater part of its contents escaped into the abdominal cavity. The remainder, amounting to about 8 fluid ounces, was collected. I made no attempt to cleanse the peritoneal cavity, but closed, first the peritoneal, and then the abdominal, incision. The patient made a rapid recovery, and left the Infirmary in a month.

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The fluid was of the colour of coffee, and contained an enormous quantity of cholesterine. When allowed to stand, the surface glistened with multitudes of the crystals. When it escaped from the cyst it was quite odourless, but in twelve hours the fœtor which it gave off passed description. Yet the best part of a pint of this fluid in the peritoneal cavity gave rise to no apparent trouble. So long, then, as we are not dealing with septic material, I venture to think that the less we disturb the peritoneal cavity by attempts at "cleansing," the better. When the matter is septic the conditions are very different. Then the resources of our art must be exhausted to prevent its entrance into the cavity; and if these fail us, its removal by direct or indirect means must be secured at all costs.

I desire, in conclusion, to express my grateful acknowledg-

ments to Dr Lackie for his support in this somewhat trying case. His skilful assistance during the operation very largely contributed to the happy issue.

References.

(1) Schrœder's Case, see Reben's Inaug. Dissert., *Zur Therapie der Uterusruptur*, Berlin, 1878.
(2) Plenio—*Centralb. f. Gynäk.*, 1885, vol. ix., p. 737.
(3) Slavjansky—*Vratsch*, 1885, No. 49.
(4) Bandl—*Ueber Ruptur der Gebarmutter*, Wien, 1875.
(5) Paul Bar and R. Mercier—*Bullet de la Société d'Obstetrique de Paris*, tome i., 1898, 36.
(6) Krukenberg—*Archiv f. Gynäk.*, 1886, vol. xxviii., p. 421.
(7) Ingerslev—*Hospitals Tidende*, 1879, No. 5, quoted in Winckel's Text Book, p. 559.
(8) Hofmeier—*Centralb. f. Gynäk.*, 1883, vol. v., p. 619.
(9) Simpson, A. R.—*Contributions to Obstetrics and Gynæcology*, 1880, p. 150.
(10) Kelly—*Operative Gynæcology*, 1898, vol. ii., p. 28.

The President said that he was sure he was only acting in accordance with the feeling of the Society, when he first of all offered Dr Milne Murray their very hearty congratulations on the successful issue of this serious case. They were indebted to him for the clear way in which he had stated the facts. While he realised that to be forewarned was to be forearmed, he also felt that Dr Murray had added to the anxieties of obstetricians by describing another cause of spontaneous rupture of the uterus.

Professor Simpson said the President had rightly voiced the feelings of the Society, in expressing its congratulations to Dr Murray on the extremely interesting paper he had read. It was to him of special interest, because it was a confirmation of the possibility of rupture of the uterus in other fashions than had been supposed to be the universal conditions. He had been blamed sometimes for the expression of his opinion upon the similar case he had recorded some years ago, as if it were based on a wrong observation.

But Dr Milne Murray's record confirmed his (Prof. Simpson's) own remarks made on that case at the time. The patient had been under treatment for cervical inflammation, and he knew it had been treated by silver nitrate (this occurred some thirty-five years ago, one must remember), and there was induration. There was unmistakably a softening in the walls of the uterus, at the site of rupture more marked than in the rest of the uterus, and fatty degeneration was found in the fibres at the site of the rent. The patient was a multipara (it was the seventh child), and had complained of unusual pains during the course of her pregnancy. Dr Murray had done well, not only to give the history of his case, but his commentary on the method of procedure, and the results at the various stages, these being so extremely interesting and sensible. The leaving open of the cervical canal was a very important element in the management of the case. One has always attempted to close it, but it was evidently for the patient's well-being to leave it in this case. If there had been any oozing at the time, perhaps it would have been well to have packed with gauze, putting the end of it through the cervix. The whole case was carried out in a masterly fashion, and the Society did not, therefore, wonder at its success.

Dr Berry Hart said he could only admire the success and ability with which Dr Murray conducted this case. It was a very bad one, and one which there was every temptation to leave alone; but Dr Murray acted quite rightly in doing as he did. The result justified his conduct, and no doubt he saved that woman's life. Dr Milne Murray had introduced some controversial matter in regard to the "toilette" of the peritoneum. They usually had a weekly discussion on this point, so he would not enter upon it now. But at the same time there were some chinks in Dr Murray's armour, because, while not denying that the abscess came from where the doubtful silk stitches were placed, it was yet an open question, because the cervical canal was patent, and intraperitoneal discharge might have escaped through it. He was not saying this in a captious spirit, but as a candid friend. The question of the toilette of the peritoneum was a disputed one. Keith

did great service in pointing out that we should dry the peritoneum as carefully as possible, but we must remember that nowadays we do our work aseptically. He still dried up the peritoneum, saying to himself that if he left fluid, and there was no sepsis, it would be absorbed; but if he left fluid, and any germ got in from the atmosphere, this fluid must form a nidus, and set up mischief.

Dr Haultain said he would like to show a small specimen similar to that Dr Murray had drawn attention to, which he removed last year about this time. The patient in this case was under Dr Muir, who was sent for in the forenoon, and found her collapsed, and in whom he knew pregnancy was advanced four months. On vaginal examination, he felt what he thought to be bowel, and having pushed his finger farther in, felt the ovum through an opening in the uterus. He sent for assistance, and Dr Wilson, of Comely Bank, went, and on examination under chloroform, found a big tear in the anterior part of the uterus, and could feel the ovum presenting through it, which he removed, together with the membranes. Dr Haultain then saw the case. The patient was removed to hospital as soon as possible, and he opened the abdomen, removed the uterus, and stitched up the bladder, in which there had been a tear. The patient died in eight or ten hours after the operation. There was no reason to suppose anything in the way of traumatism. What caused the rupture he could not say, but that it did happen there was no doubt.

Dr Haig Ferguson said he wished to congratulate Dr Murray on the successful issue of his case. He should like to record a case he saw some two years ago. It was diagnosed as rupture of the uterus, occurring spontaneously in a woman in the sixth or seventh pregnancy, practically at full time. She was collapsed, almost pulseless, the abdomen evidently filled with blood, and the diagnosis lay between rupture of the uterus and rupture of some vessel in the broad ligament. On opening the abdomen, which was done in a very bad light, no definite bleeding spot could be found. It was supposed bleeding came from one of the dilated veins. The uterus was removed. The woman lived for only twenty-

four hours. On *sectio*, the abdomen was found again filled with blood, the main source of the hæmorrhage was not from the uterus, but from a ruptured spleen, the tear in which was three to four inches long. No cause for the rupture of the spleen was discoverable. There had been no fall, nor injury to the ribs.

The case was interesting, in that one was justified in concluding that the uterus was ruptured; and in the unsatisfactory light in which the operation was done, it was impossible to discover the rupture of the spleen.

With regard to draining the peritoneum, as far as his experience went, Dr Murray's remarks were very just. The only addition he would make was that, when one remembered the position of the patient in bed, all the fluid naturally gravitating to the lower part of the abdomen — the pouch of Douglas—the peritoneum in that situation must get somewhat exhausted, and would ultimately cease to absorb fluid in the same way as immediately after operation. If one raises the foot of the bed, so as to allow any fluid which may be in the pelvis to gravitate upwards, and thus distribute it over the peritoneal surface, one facilitates very much the absorption of the fluid, and lessens the chance of the occurrence of sepsis.

Dr Milne Murray, in reply, said he thanked the President and Fellows for the very kindly way in which they had received the paper. With regard to the question of fundal rupture, he excluded all those cases as being outside the line of this case. He quite realised that a large number of cases had taken place in which the rupture had been transverse. Some of these were probably associated with interstitial pregnancy, and possibly some with damage to the tube itself. With regard to intraperitoneal sepsis as being the cause of the complication in the convalescence, he should be very sorry to think it possible. For twelve days the course of the case was quite normal, the temperature varying very slightly day by day, and then suddenly, on the thirteenth day, it ran up, and on the sixteenth day pus came away. If the case had been an infective one of the peritoneum, surely there would have been trouble at an earlier period,

and he hardly thought that nothing but a baggy swelling in the cellular tissue, from which pus could be made to well out, would have been found. The convalescence was extremely rapid, the whole process of the disturbance only occupying five days.

VII. THE SEPARATION OF THE PLACENTA, WITH SPECIAL REFERENCE TO THE INFORMATION DERIVED REGARDING ITS MECHANISM FROM CASES OF CONSERVATIVE CÆSAREAN SECTION.

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For some time it has been in my mind that there was a possibility that some light might be thrown on the mechanism of the third stage of labour by observing what happened in the uterus after removal of the child, in the operation so many now term the Conservative Cæsarean Section. Indeed, I made this suggestion in a short clinical paper on Cæsarean Section, which I read at the British Medical Association meeting last autumn. I was under the impression at the time that the idea was original. Alas, however, I was doomed to disappointment, for I discovered, when I came to consider the subject carefully, that Sänger discussed the question as far back as 1885. My hope, therefore, that I would have originality to urge by way of an excuse for this paper was early dispelled.

In the third stage of labour there are two distinct phenomena—the separation of the placenta and the expulsion of the placenta and membranes. To-night I purpose alluding only to the separation of the placenta, hoping at some future date to take up the mechanism of its expulsion. Our knowledge regarding this has been derived, I take it, from the following sources: (*a*) Speculation; (*b*) Clinical examination in normal labours; (*c*) Examination of uteri removed by Porro's operation; (*d*) Examination of uteri removed post-mortem in cases where the parturient women died immediately before or immediately after the expulsion of the child, and where, in consequence, one could

not speak of a third stage having occurred; (*e*) Examination of uteri removed post-mortem, either with or without the pelvis, and where the third stage had been in progress for a longer or shorter time; (*f*) Observations made in cases of conservative Cæsarean section.

(*a*) Speculation.—The older investigators only speculated as to how the placenta separated. The highest level was reached by Baudelocque. There is no evidence that he did more. Champneys, for instance, writes: "Baudelocque's description of various modes of detachment, according to the situation of the placenta, has not, so far as I can find, been founded on direct observation." Schultze, who originated the idea of the retro-placenta hæmatoma, although speculative and a follower of Baudelocque's teaching, based his views latterly largely on the results obtained by Lemser, as he says himself in his last remarks on the subject.

(*b*) Clinical examinations in normal labours.—The earliest direct clinical examinations were made by Lemser. But much more important than these were the results obtained by Schrœder. I quote some of his remarks from Champneys, as I have not got the original to hand. He gives notes of seven direct observations made by introducing the hand into the uterus immediately after the birth of child:—

(1) The hand, introduced immediately after the birth of the child, felt the placenta (palpated bimanually) thicken during the first contraction of the uterus, and its lower edge and the adjacent membranes bulge. After the contraction the bulging remained, and another protuberance was felt near the middle of the placenta. The next pain made the placenta bulge still more, the hæmatoma became thicker, and extended beneath the membranes, then the placenta was depressed from the fundus and protruded into the "contraction ring" (of Bandl), with the fœtal surface inverted.

(2) A pain caused the fœtal surface to bulge; the lower edge especially became thick and protuberant. In spite of the absence of powerful pains, the placenta sank from the fundus and advanced edge first. The lower edge of the membranes then burst, and the placenta appeared at the vulva lower edge first.

(3) The placenta became raised in a fold, and descended inverted.

(4) The placenta descended inverted.

(5) Immediately after the birth of the child the placenta was found inverted, with a subplacental hæmatoma (fig. 39, s. 101).

(6) Immediately after the birth of the child the lower edge of the placenta and membranes was found bulging, and the placenta began to descend edge first. Then the part situated at the fundus bulged and became inverted.

(7) The placenta descended inverted.

Cohn's observations confirmed those of Schrœder. The former gives a direct observation (Champneys),—"The hand was introduced immediately after the birth of the child, and found the placenta thickened, but entirely adherent. First pain: thickening increased, still adherent; diastole; large subplacental hæmatoma, bulging of the centre and lower border with the adjacent membranes. Second pain: the placenta suddenly passed into the lower uterine segment. The patient was made to bear down, the membranes burst, and the placenta was expelled edge first (Duncan's mechanism). It is during relaxation that the subplacental hæmatoma is formed (s. 392). Subsequent contractions use this blood to separate the placenta and membranes."

Clinical observations made by introducing the hand into the uterus indicate that a separation of the placenta occurs, and behind the separated placenta that blood accumulates.

The objections to this method of investigation are obvious. The results obtained are of doubtful value, as the normal condition of matters is disturbed by the introduction of the hand and the access of air into the uterus.

In recent times there has been some discussion as to whether or not the uterus assumes a globular shape when it contracts. Quite recently Gessner made an interesting observation in this connection. A woman was admitted into the clinique advanced in labour, but with a tumour to the left and behind the uterus, which prevented the child from descending. Abdominal section was performed, the tumour, a subserous myoma, was removed, and the child was extracted *per vias naturales* by the craniotclast. The contractions of the uterus after the birth were

observed, and the uterus was found to assume more of a ball-shape, but not to become completely globular.

Personally, I have always found the uterus become more globular when it contracted, and this both in ordinary cases and when observing the uterus after extracting the child in Cæsarean section.

(*c*) Examination of uteri removed by Porro's operation.—Such specimens have been most valuable, for they have demonstrated beyond question that retraction alone cannot bring about placental separation. A few have shown that thickening of the placenta at the edges occurs, but in none has the placenta become separated.

(*d*) Examination of the uteri removed post-mortem in cases where the parturient women died immediately before or immediately after the extraction of the child, and when, in consequence, one could hardly speak of a third stage having occurred. —Such specimens demonstrate that retraction of the placental site alone does not bring about separation. They also do more, however. In Pestalozza second section of a third stage uterus, a case of twin pregnancy, neither placenta is in the slightest degree detached. The author states, I quote from Barbour: "Probably there were some contractions of uterus after delivery." In Pestalozza other section of third stage uterus there was also no separation of placenta. The mother died immediately after extraction of the child.

Quite recently, in the Maternity Hospital, a woman died under chloroform while I was extracting the child. I could not say whether she died before or after the extraction of the child. I removed the placenta with the object of letting her bleed. The placenta was attached all round, and was in no part separated.

Some of Pinard and Varnier's sections, especially the case of triplets, were of interest. In the latter the three placenta were still attached. It should be mentioned, however, that the death of the mother occurred before the delivery of the fœtuses.

A very important case of Pinnard and Varnier's is described by Barbour (p. 107) as follows: "Plates 1 and 2 show sections of the uterus removed from the body of a primipara with hæmorrhagic scarlatina, who died immediately after the extrac-

tion of the fœtus with forceps. In spite of the reduction of its site produced by retraction, the placenta is not separated; it has been able, without letting go its hold, to accommodate to this reduction by folding itself on its fœtal aspect, by making its borders project—which from being mere lines in the gravid uterus, have become thick and rounded—and by bulging towards the uterine cavity instead of towards the uterine wall, as in pregnancy."

Stratz's second case only confirms the view that great retraction may occur without separation of the placenta.

The latest section described is that of Stephenson. It was that of a primipara, who died of acute lung disease. The placenta is seen still attached to anterior wall of uterus. The author says: "In the present case contractions came little if anything into play."

Our conclusions, therefore, from such specimens must be that retraction is not sufficient to cause separation; that possibly slight contractions may occur without it resulting; that in some cases there is a bulging of the placenta inwards.

(*e*) Examination of uteri removed post-mortem, with or without the pelvis, and when the third stage had been in progress for a longer or shorter time.—You can readily understand, as far as the mechanism of the separation of the placenta goes, the cases where there have been a few contractions are the most suitable. Indeed, when there have been several, and they have been energetic, the placenta is completely detached, and the cases are only of service as bearing on the expulsion.

Let us examine, then, the cases of partial separation of the placenta.

Undoubtedly, the most important cases in this connection are the two reported a few years ago by Gessner. Curiously enough, they are not referred to by Barbour in his most valuable work on the *Mechanism of Labour*.

The second case shows an early stage of separation. It was that of a young woman suffering from eclampsia, who died shortly after the extraction of her child. The placenta is seen separated in three places, and there are effusions of blood in each.

As showing also an advanced stage of separation, Keilman's case comes next. It is referred to and figured by Alfeld. It

shows a retro-placental hæmatoma, with the placenta partially detached and bulging toward the uterine cavity. Unfortunately, I have not been able to get Keilman's description of the specimen, but Ahlfeld states that it presented appearances as described.

The other case of partial detachment is Gessner's first case. It is an extremely important one. The woman, an xi.-para, was attacked with eclamptic seizures. She was treated with chloral; rupture of the membranes and a foot was brought down through the os, which was sufficiently dilated to admit two fingers. Labour advanced rapidly without hæmorrhage. At 12.50 she was delivered of a fresh dead child; at 1.5 she died. After an examination of the body, frozen sections were made of the pelvis, lower trunk and limbs, with parts enclosed.

The placenta was found in part separated. A portion on the anterior and posterior walls was still adherent, but the middle part projected downwards. There was a collection of blood behind the latter. From these sections it must be admitted that the honours rest with those who maintain that separation and projection of the placenta occurs, and an accompanying accumulation of blood behind the separated portions—results, please observe, similar to those obtained by Lemser, Schroeder, and the older observers. The objection urged against results derived from such sources as have just been mentioned is, that the specimens have been obtained from patients who died during labours which were running an abnormal course. That certainly is true; but it increases greatly their importance, however, if the results derived from different sources agree, even although the conditions under which they are obtained are abnormal.

The frozen sections, especially the one of Pinard and Varnier, where the placenta has been completely detached, cannot be considered of any value as bearing on the separation. They will be considered when expulsion is being discussed.

(*f*) From observations made on cases of Conservative Cæsarean Section, Sänger, in 1885, as I have said, first referred to the value to be attached to such a method of examination as bearing on the third stage of labour. He was not enamoured with it, although he so far admitted the possi-

bility of its being of service as to lay down certain matters which should be attended to while making observations.

A few other writers have expressed themselves equally unfavourably. Amongst these may be mentioned Champneys and Gessner, who each referred to the disturbed conditions under which the third stage is completed in Cæsarean section. Sänger appreciated, however, from his own and Leopold's cases, that the uterus might retract without separation of the placenta, and that the latter was easily detached.

The only further observation of any note on this aspect of our subject is a most interesting one by Ahlfeld :—

Ahlfeld was looking on one day while Sänger performed a Cæsarean section. He observed the following occurrence. Immediately after the removal of the child, the placenta, which was situated on the posterior wall of the uterus, bulged forward. On palpating it was found to be elastic, and separated completely, except at its margin. Having separated the margin, blood flowed freely, and the placenta sank back against the wall of the uterus.

But let me now tell you about my material, and the observations I made upon it. The material was eight cases of Cæsarean section. It may interest you to know, although I am in no way considering that aspect of the subject at present, that all the mothers made excellent recoveries, and that all the children except one were extracted alive.

There were eight cases, as I have said. In six I opened into the uterus by the ordinary vertical incision; in two by the fundal incision "nach Fritsch." In two where the incision was vertical, and in one where it was fundal, I came down upon the placenta, and had to separate it in part or entirely before extracting the child. In the remaining five cases the placenta was situated on the posterior or postero-lateral wall.

One of the two cases where the fundal incision was employed was specially interesting. The placenta would not separate, although the uterus was made to contract energetically by kneading. It had, therefore, along with the membranes, to be stripped off the uterine wall. The reason for this, in all probability, was that the degenerative

changes in the placenta, which occur prior to its being shed, had not advanced sufficiently.

The patient was a primipara, with a generally contracted, flat, rachitic pelvis. I repeatedly asked her on her admission to hospital if she had reached full term, because, from the appearance of the abdomen and size of the child, I thought that she had not. She always insisted that she had, and she had painful uterine contraction when admitted. She could hardly, however, have reached her thirty-sixth week, as the child when extracted measured only 17 inches, and weighed only 4 lbs.

In passing, allow me to say that to my mind the only objection to operating before labour has started is that sometimes one may operate quite distinctly before term.

But to return to the case I was describing. It was one in which I made a fundal incision, and so I could look into the uterus and see all that went on inside. Well, in looking through the incision, I saw the placenta apparently not affected by the retraction. Its edges were pronounced but not separated, neither were they separated when after compression with hot swabs the uterus firmly contracted. During the contraction the placenta seemed to thicken.

I also observed something else, however. When the uterus contracted there was a separation between the anterior and posterior walls of the uterus of, I should say, 2 inches at least. I could not measure the distance exactly. The uterine wound through which I observed this became diminished in size during the contraction, at the widest part, sagittally, the edges of the wound were not separated more than 1 inch. Unfortunately, I did not make an exact measurement. Having noted the above occurrences I put in my hand and removed the placenta and membranes, after which the uterus was made to contract energetically when again I observed a separation between the two walls. The uterine wound was then stitched up with catgut, and the operation completed.

In all cases, after delivery of the placenta when the uterus contracted, the anterior and posterior walls of the uterus became separated. In the last case I operated on I made a fundal incision, and by doing so, came down on the middle of

the placenta. On looking through the wound during a contraction I could distinctly see the walls separating as the uterus contracted.

Regarding the four cases where the placenta was situated on the posterior or postero-lateral wall of the uterus, and where it separated shortly after the expulsion of the child, I found that the uterus retracted as the child was withdrawn. The uterus being then grasped by my assistant between two warm swabs, was pressed firmly, to bring about an active contraction, and to control bleeding. During that time I tied the cord and saw that the child was all right, and by so doing occupied from one to two minutes. When I then turned to the uterus and removed the swabs I always found the placenta separated. I have had even better opportunities for observing this easy and rapid separation of the placenta in the many cases—I should think not less than twenty in number—in which I have assisted Professor Murdoch Cameron. My experience has been that contraction and compression separate the placenta immediately. I have never seen portions of placenta left attached. A word or two as regards the conclusion to be drawn from these observations in cases of Cæsarean section.

Personally, I am quite satisfied that during the contractions of the uterus there is a separation of the two walls. I cannot think that the incision of the muscular wall and the free access of air into the uterus, which are of necessity accompaniments of the operation of Cæsarean section, negative the value of the observations as bearing on the mechanism of the third stage under normal conditions. This may appear a small matter, but all who are acquainted with the subject know that Barbour's theory of the separation and expulsion of the placenta falls to the ground if it can be proved that there is a separation of the walls. I believe this has been done. I have long felt from clinical observation that the globular or approximately globular form which the uterus assumes during contractions pointed to this, and it was largely that idea which prompted me to look for the phenomena I have described.

As regards Hart's contention, I cannot express an opinion. I do know, however, that contractions alone in some of the cases I have described brought about a separation. I quite

see that, in the uterus left to contract and recoil, the latter occurrence might aid in bringing about separation. It is, however, my belief that the principal factor in doing so is the active contraction.

Looking over the whole subject dealt with in this paper, I would make the following statements:—

1. There are two distinct divisions of the third stage—separation and expulsion of the placenta.

2. Retraction alone does not bring about separation of the placenta.

3. The separation occurs chiefly by contraction, and possibly also by recoil.

4. During contraction the walls of the uterus become separated.

5. The separation of the placenta may occur at the edge or centre.

6. Blood is effused into the areas of separation.

7. This effused blood may in part effect the further separation of the placenta.

References.

AHLFELD—*Lehrbuch f. Geburtshülfe*, 1898, p. 123.
BARBOUR—*Mechanism of Labour*, 2nd edition.
CHAMPNEYS—*Trans. Obst. Society, London*, 1887, vol. xxix.
GESSNER—*Zeit. f. Geb. v. Gyn.*, 1897, Bd. xxxvii., p. 16.
HART—*Trans. Obst. Society, Edinburgh*, vol. xxvi., 1901, p. 77.
PESTALOZZE—*Vide* Barbour's *Mechanism of Labour*.
PINARD and VARNIER—*Vide* Barbour's *Mechanism of Labour*.
STRATZ—*Vide* Barbour's *Mechanism of Labour*.
SÄNGER—*Archiv f. Gyn.*, 1885, Bd. xxvi., p. 163.
STEPHENSON—*Scot. Med. Surg. Jour.*, ii., 1898, p. 20.

The President said that the paper just read was a valuable contribution to this subject. But Dr Munro Kerr must acknowledge that the uterus, after having been opened, contracted under different physical conditions from those which existed when the organ was unopened. If the two uterine walls were separated the space must be filled with something, which must be air or blood. If air, it should be heard entering

or leaving the vagina. He had heard in a very few cases the passage of air, but this was a very rare occurrence. It could not be blood, because occasionally, as Dr Murray had stated, the placenta was delivered with the loss of only a few drops of blood. He had not quite gathered from the paper what value Dr Munro Kerr attached to blood-clot in the separation of the placenta. Possibly in some cases it might assist, but certainly it was not an essential.

Dr Berry Hart said he thought Dr Munro Kerr's paper an exceedingly valuable one. It was very interesting to know what he had noted in cases of Cæsarean section, especially in those in which the fundal incision was made. Of course, the whole point was this, that while undoubtedly Dr Kerr, in his cases of fundal incision, saw the walls separated, did this occur in normal labour? There were some points we must really well consider. Did Dr Kerr suppose there was actually separation of the walls in a normal case; that there was a space formed? If so, what was in the space? He would not argue about his own view on the subject, as he almost began to believe he must be wrong, as everybody said so. But he did not see how Dr Kerr's opinion could possibly be correct. He believed it happened in these cases with fundal incision, but how it could happen in a normal labour was more mysterious than anything he had ever thought of. In Porro uteri, whatever incision was made, a disturbing element was introduced, and the great point was to reconcile the conditions with that disturbing element introduced and the actual normal mechanism. But it was always valuable to have these facts that Dr Kerr had given the Society.

Dr Milne Murray said that they had certainly listened to this paper with much interest, and to the observations on these cases of Cæsarean section. Those with the fundal incision were of extreme importance. He thought, however, that Dr Hart had hit upon the weak point in Dr Kerr's theory of placental separation, because he did not think that it is possible to conceive that the walls of the uterus could separate from one another unless there was something to fill up the space between them. Suppose they took it that the separation was roughly over an area of 4 square inches, he calculated that the

uterus would have to overcome a pressure of not less than 150 lbs. If the uterus could do this, it would certainly suck the blood through any sinus or through any muscular sphincter, however completely closed, so that the assumed space would at once be filled in. As a matter of observation, in a run of six confinements one or more of the placentas would be discharged without any blood at all to speak of, either accompanying or following it. If there was separation under the circumstances Dr Kerr suggested, blood would be bound to follow. It could not be otherwise, in view of physical facts. Dr Kerr observed the uterus when opened to the air. The uterus may tend to bulge in the natural course of contraction, and if so, the moment you opened the fundus the air would rush in. For himself, he could not believe that the explanation which Dr Kerr had given—that the separation of the placenta was dependent on the separation of the walls of the uterus—was correct, or that he would convince many that he had yet hit upon the right theory of placental separation.

Dr Mac Vie said that although he had no personal experience of what had been described by Dr Kerr, yet he thought it quite possible, by piecing together reported cases, to get a fairly accurate idea of what took place during the expulsion of the placenta. He thought Dr Kerr had given a statement of the process as near the actual facts as could be given. With regard to the observation of the separation of the uterine walls during a contraction, if one thought of a hollow viscus brought into a state of rigidity by muscular fibres, it seemed impossible to have anything but a cavity of an ovoid shape. The question, what occupies the cavity, is a separate matter. In the first place, the cavity will have diminished in size during the contraction. Instead of the potential cavity of a flaccid organ, there is the actual cavity of a rigid ovoid, but of lesser capacity than before the contraction. During the separation of the walls the placenta might not completely fill this actual cavity without some degree of expansion of its volume by an alteration in the amount of blood still flowing through it. If this were not enough to fill the cavity, the placenta might be pulled by a suction force away from the uterine wall, and at the separation blood would flow and prevent a vacuum. In such a way one

might explain the formation of a retro-placental hæmatoma, and throw light on the subsequent expulsion. If the hæmatoma was formed near the placental centre, and the separation proceeded equally all round, then the placenta would be expelled inverted. If, on the other hand, the hæmatoma were formed nearer the placental margin and the separation proceeded equally all round, the edge nearest the hæmatoma would be reached before the margin opposite was separated, the collection of retro-placental blood would escape, and the placenta expelled marginally and folded upon itself.

MEETING III.—JANUARY 8, 1902.

Dr JAMES RITCHIE, *President, in the Chair.*

I. The following gentlemen were elected Ordinary Fellows of the Society:—C. W. Salebey, M.B., Ch.B., 3 Malta Terrace, Edinburgh; J. A. Douglas Thompson, M.B., Ch.B., Barmeal, Port William, Wigtownshire.

II. *Dr Brewis* showed—(*a*) A RIGHT KIDNEY, with a girth of 48 inches, weighing 45 lbs. He intended making a further communication upon the case. (*b*) A SMALL CALCULUS taken from pelvis of kidney. The patient had suffered from pain in the left lumbar region for some time, leading to emaciation and a neurotic condition. He catheterised the ureters, finding the urine from the right kidney practically normal, while that from the left contained masses of cells from the pelvis of the kidney. A specialist was of the opinion that it might be cancer. In two months he catheterised again, and finding the same condition present, he cut down upon the kidney by the ordinary lumbar incision, and brought it out of the wound. On palpation it seemed quite normal; but a resistance was felt in the pelvis of the organ, and on opening it an oxalate of lime calculus was found and removed. The patient did well, and is now plump, strong, and well. (*c*) CALCULUS removed from gall bladder in a patient in whom there was movable kidney. (*d*) FIBROID

TUMOURS. The patient had been married two years; was pregnant a year ago. The doctor called in found a tumour in the pelvis, and induced premature labour on account of this. Dr Brewis saw the case later; found swelling in Douglas' pouch, evidently subperitoneal fibroid, and, on operation, five fibroids were shelled out, the uterus and appendages not being removed. (*e*) FIBROID TUMOUR from a pregnant woman, in which, on opening the abdomen, he had hoped to leave the body of the uterus; but it was so very vascular, and there were so many small tumours, that he thought it better to remove the uterus. (*f*) EXTRA-UTERINE TUBAL GESTATION, just on the point of rupture.

III. *Dr Berry Hart* showed MICROSCOPIC SPECIMENS OF ACTINOMYCOSIS OF THE OVARY.

IV. *Dr Haig Ferguson* showed THUMIN'S ANGIOTRIBE.

V. AN EXPERIMENTAL STUDY OF THE PELVIC CHANGES PRODUCED BY SEPARATION OF THE PUBIC BONES IN SYMPHYSIOTOMY.

By ALFRED C. SANDSTEIN, M.D. (Gold Medallist), James Scott Scholar, Freeland Barbour Fellow, Murchison Memorial Scholar, Gunning Victoria Jubilee Prizeman in Obstetrics, Syme Surgical Fellow of the University of Edinburgh.

THE following paper is condensed from a portion of my thesis presented for the degree of Doctor of Medicine of the Edinburgh University, and is based upon experiments performed on twenty-eight female cadavera taken at random in the post-mortem theatre. Many columns of figures necessary in a graduation thesis have been omitted from this paper, and I have limited the tabular statements to such as were absolutely necessary for the elucidation of my meaning or for the confirmation of my statements.

The experiments consisted in measurement of the diameters of the false pelvis and of the brim of the true pelvis, of the vertical height of the sacral promontory, and of the interspinous diameter above the upper margin of the pubic symphysis, first

of all in the natural state, and then after division of the symphysis and separation of the pubic bones.

The body had already been incised in the middle line down to the mons veneris for the purposes of the autopsy. I therefore merely separated the tissues from the pubes and iliac crests, and cleared the sacro-iliac joints, and marked the extremities of all those diameters whose terminations were not indicated by definite bony landmarks, with small saw-cuts. The vertical height of the sacral promontory was estimated by means of a plumb-rule and a millimetre measure set at right angles to it. With regard to the interspinous diameter, I measured the shortest distance between a ruler placed on the anterior superior spines and the upper edge of the symphysis, although in several cases I estimated the exact vertical height at which this diameter stood above the same point. The object of these last measurements will appear in the course of the paper.

Having made these measurements, and a catheter having been introduced into the bladder to empty it and to define the urinary organs, the symphysis pubis was divided from above downwards, and the separation of the pubes carried out by increments of 1 centimetre, from 1 up to 8 centimetres. To do this I had blocks of ebony, of thickness varying from 1 to 8 centimetres, made, and these were in succession introduced between the separated pubes. The measurements were, so far as time allowed, repeated after each increment of 1 centimetre. Professor Simpson very kindly lent me Prochownik's callipers for making the measurements.

At first sight it would seem unnecessary to open a paper on the operation of symphysiotomy with a discussion of the movements of the innominate bones during the separation of the pubes. Superficially, it would seem as if the words "during the separation of the pubes" contained a sufficient description of all the movements that take place, and that rotation of the innominate bones so as to carry the pubes directly outwards was all that occurred.

The general conception of symphysiotomy is that of an operation whose design is to increase the true conjugate by section of the pubic symphysis, thus permitting such separation of the pubes outwards; but this is based on insufficient

study of the anatomical relations and shape of the bony elements concerned. I also hope to show that the true significance of the pubic section in symphysiotomy is not that it will permit separation of the pubes directly outwards, but rather that it will remove an actual barrier or limitation to a movement present in the pelvic girdle before any section of the symphysis pubis is carried out at all, and that it allows a third movement to occur which could not otherwise take place.

The movements that occur during, and increase with, the separation of the pubes after symphysiotomy are:—

1. Movement of the pubes outwards by rotation of the innominate bones on vertical axes passing through their respective sacro-iliac joints.

This movement I describe, for reasons which will be apparent later, as unnatural and forced, and a little reflection will easily show that it is of very little use. For the present it will serve merely to point out that the shape of the pelvic inlet is elliptical, and that the pubes, rotating transversely outwards on the sacro-iliac joints as centres for their movement, sweep on the circumference of a circle, on or near whose most anterior point (with relation to the sacral promontory) they are already situated. Consequently the outward rotation can only increase the sacro-pubic diameter to a limited amount; for although each pubis is carried further from the sacral promontory than it was before, by every access of pubic separation, yet it is not so with the line joining the two pubes, which, indeed, in some shapes of pelves, may even be carried nearer the sacral promontory.

2. The second movement consists in rotation of the innominate bones on a horizontal transverse axis passing through the sacrum, and carries the pubes downwards.

This movement was first indicated by Wehle, who, having attached weights to the pubes of a pelvis excised from the body, divided the symphysis. He could, however, only ascribe an increase of the oblique diameters to it. This is not at all its significance. Dimante (*Répertoire Univ. d'Obst. et de Gyn.*, 1894) states that when the pubic bones in the cadaver are pressed apart the sacrum rotates on its transverse axis, so that the promontory swings backwards and its apex forwards. He could only see in this "an objection to symphysiotomy on

mechanical grounds," the antero-posterior diameter being diminished more and more from above downwards. In my cases I obtained proof of the existence of this movement by measuring the exact vertical height of the centre of the sacral promontory above the upper end of the symphysis pubis, and comparing it with the vertical height of the same point above the line joining the upper end of the separated pubes after each increment of pubic separation. This was done by means of a plumb-rule and a measure set at right angles to it, stationed on the centre of the sacral promontory.

I give below a table of the cases:—

No. of Cases.	With Pubic Separation of	Increase of Vertical Height of Sacral Promontory.	
		Mean.	Average.
10	1 centimetre	2·5 millimetres	3·2 millimetres
11	2 centimetres	5·0 ,,	5·2 ,,
10	3 ,,	6·5 ,,	7·6 ,,
10	4 ,,	7·5 ,,	8·85 ,,
7	5 ,,	9·0 ,,	9·2 ,,
3	6 ,,	13·0 ,,	13·0 ,,
6	7 ,,	7·5 ,,	9·6 ,,
8	8 ,,	9·5 ,,	8·6 ,,

In twenty-three cases the mean increase of height of the sacral promontory above the symphysis pubis for each centimetre of pubic separation was 1·4 millimetres (the average increase 1·64 millimetres). Thus, with a pubic separation of 6 centimetres the amount of depression of the symphysis pubis below its original horizontal level would be 8·4 millimetres (or, calculating from the average, nearly 1 centimetre). This, therefore, is proof of the existence of such a movement of the innominate bones, and we may at least calculate on a depression of the pubes of 1·4 millimetres for each centimetre of pubic separation.

There are certain facts, however, that corroborate this downward movement. The lateral margin of the base of the sacrum (at the upper edge of the auricular area), although at first flush with the corresponding border of the innominate bone, with each increase of pubic separation projects more and more above

the level of the innominate, so that the salient angle of the sacral auricular area becomes elevated above that of the os innominatum. In cases where I excised the sacro-iliac joint *in toto*, after a pubic separation of 6 to 8 centimetres, I found that while outward separation of the surfaces had been limited, and was still very difficult, the iliac part could be easily rotated on the sacral, giving the posterior ligament a slightly spiral twist downwards.

3. Besides these two movements of rotation of the os innominatum on vertical and transverse axes respectively, passing through the sacro-iliac joint, so as to carry the pubes both

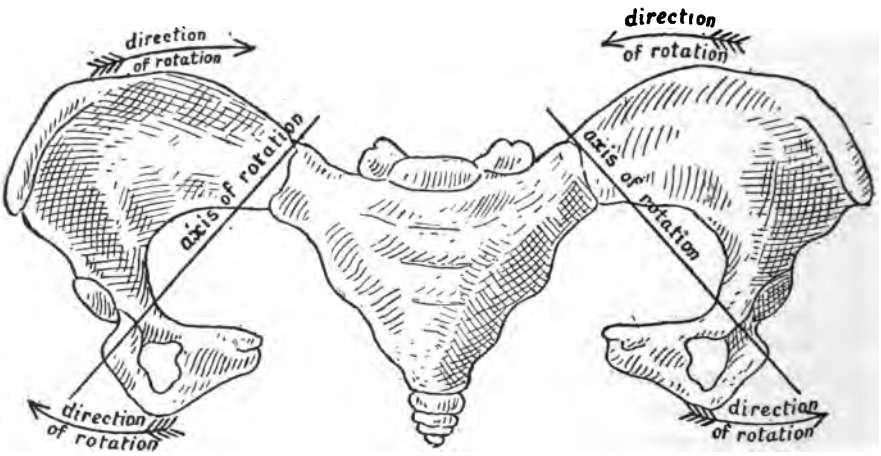


FIG. 1.

downwards as well as outwards, a third and hitherto undescribed movement occurs.

This movement consists in rotation of the innominate bone on its own long axis (an axis lying in a direction from the posterior superior spine to the iliopectineal eminence), so as to cause the ilium to become more erect (or vertical). That is to say, as the pubes pass downwards and outwards, the tubera ischii, relatively to the rest of the bone, are carried further apart, while the iliac crests, relatively to the rest of the bone, approximate to one another. The innominate bone, as it were, revolves on its own axis, the upper part moving inwards to-

wards the middle line, the lower part revolving outwards (Fig. 1).

In eighteen of my cases I ascertained the existence of this movement by placing a ruler against the anterior superior spines, and simply measuring the shortest distance between

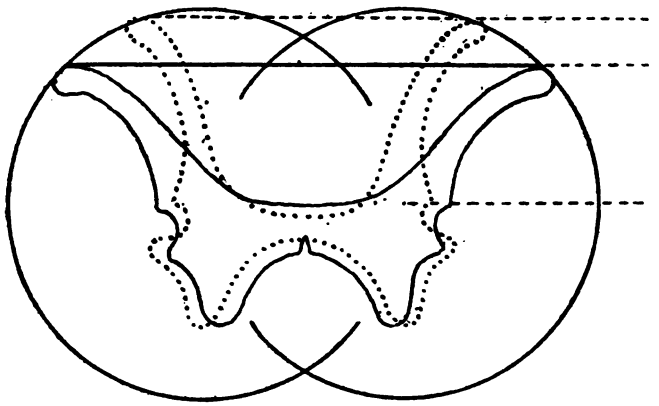


FIG. 2.

this and the upper end of the symphysis pubis. In every case, with each increment of pubic separation the distance between the interspinous diameter and the horizontal level of the symphysis pubis increased. In five cases I took the vertical height of this diameter above the symphysis pubis by using the plumb-rule, as in the case of the sacral promontory. This measurement also increased with the amount of pubic separation.

From this it is an obvious deduction that, as the pubic bones are separated, the innominate bones rotate on their long axis, so as to carry the iliac crests more inwards towards the middle line. For the distance between the anterior superior spine and the pubic spine of the same side is a fixed quantity, and cannot alter however much you disturb the relation of one pubic spine to its opposite fellow. Thus it comes about that, leaving separation of the pubes from one another aside, and supposing the pubes to remain in contact, the interspinous diameter could only increase its distance from the pubes by each innominate bone rotating on an axis between the sacro-iliac joint of its own side

and some point on it anterior to that, so that the iliac crests would move on the circumference of a circle whose centre was on that axis, and would pass inward towards one another and at the same time upwards to the highest point on the circumference of that circle (Fig. 2).

This movement, of itself, would involve a shortening of the interspinous and intercristal diameters, were it not that any such shortening is more than compensated by, and lost in, the increase brought about by the outward movement of the bones after pubic section.

That this increase of the distance of the interspinous diameter from the pubic bones is not due to the outward rotation of the bones placing the line joining the pubes more anterior to that joining the anterior superior spines than hitherto, is proved by the fact that the vertical height of the interspinous diameter also (not merely the distance from the pubes), as I have just stated, increases with the amount of pubic separation. In five cases this vertical measurement increased by an average of 1·5, 3·5, 2·0, 4·0, and 1·3 millimetres respectively per centimetre of pubic separation. The mean of these averages is 2 millimetres (the average 2·4 millimetres).

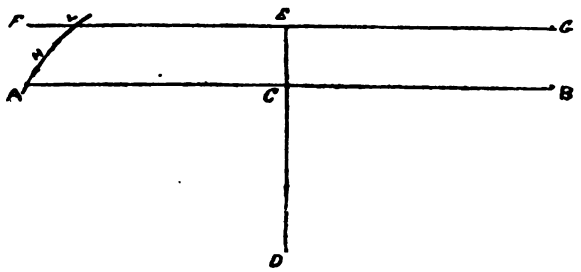


FIG. 3.

AB = mean length of interspinous diameter, and represents that diameter; *CD* = mean vertical height of interspinous diameter, and *D* represents the symphysis (upper end); *CE* = mean increase of vertical height of interspinous diameter; *FG* = interspinous diameter in its new position after the rotation; *AHL* = arc of circle with centre *D*, cutting *FG* at *L*.

Thus with 6 centimetres of pubic separation the average increase in vertical height of the interspinous diameter above

the level of the pubes will be 1·2 centimetres, or ½ an inch. The amount of rotation in these five cases was sufficient to move each anterior superior spine along the circumference of a circle for the distance of $\frac{7}{10}$ inch on an average. This result I arrived at by constructing the following figure from the preceding five cases (Fig. 3).

Having proved that the second and third movements exist, I shall endeavour to show that they are entirely in accordance with the natural structure of the pelvis; that the former exists before symphysiotomy, and that the latter is the result of the operation, its effect being merely to extend the former by producing a further dipping of the pubes.

The sacro-iliac joint, composed of articulating sacral and iliac surfaces, is not a synchondrosis, but is capable of slight movement. Zaglas, Wood, and Matthews Duncan all admit this. Matthews Duncan, in his *Researches in Obstetrics*, describes a precisely similar movement to my second movement, "consisting in the elevation and depression of the symphysis pubis, the ilia moving on the sacrum. . . . By the elevation of the symphysis pubis the angle of inclination of the pelvis is lessened, and the conjugate diameter of the brim of the pelvis is diminished to the extent of one or two lines." Lenoir found that in females between eighteen and thirty-five years the joints had a simple sliding motion. Cazeau says that the very limited sliding movement of the sacro-iliac joint represents a considerable dip of the pubes.

These authorities allow the existence of the second movement in the undivided pelvis, but others prove not only that it exists, but that it increases the true conjugate. Walcher experimented on the pelvis of an eclamptic woman, and found that the extremes of elevation and depression of the pubes when the thighs were bent on the abdomen, and then allowed to hang down, gave an increase of the true conjugate of 8 millimetres. This occurs through the action of the mechanism described by Duncan. Klein[1] confirmed Walcher's result, and stated its occurrence at all ages, in both sexes, and in all forms of pelves. It is more marked in contracted pelves. Pinzani,[2]

[1] *Zeitsch. für Geburts. und Gynäk.*, 1891. [2] *Ann. de Gyn.*, 1899.

Korsch,[1] Balandin, Lebedeff and Bartoszewicz,[2] Bonnaire and Bué, Pestalozza and others, confirm Walcher's statement. Further movement at the sacro-iliac joint occurs in cases of anchylosis of the hip-joint.

But the most convincing proof is found in the natural construction of the sacro-iliac joints. The articulating surfaces consist each of an antero-inferior and a postero-superior part, the antero-inferior part being the auricular area covered by cartilage of the same contour, firmly adherent to it. The joints formed by these surfaces favour downward movement of the pubes in two ways: (1) By their ligamentous construction. For the superior and anterior sacro-iliac ligaments, thin and feeble, cover in the joint above and in front. The posterior ligament, including the oblique ligament, binds the bones firmly together posteriorly, and is aided by the greater and lesser sacro-sciatic ligaments. Thus, these ligaments bind the bones strongly together behind, and form, as it were, a fulcrum and centre for movement, while in front they are thin and feeble. Below, also, the sacro-sciatic ligaments would be tightened by any attempt at upward rotation at the sacro-iliac joint, unless as a recovery of a former position after they have been relaxed by downward rotation at the sacro-iliac joint. So that the construction of the sacro-iliac joint not only favours downward movement of the pubes, but compels it to combine with the outward movement.

(2) By the conformation of their articular surfaces, and of the sacrum as a whole. For a projection on the salient angle of the sacral auricular area fits over a bevelled-off area on the salient iliac auricular angle, and that iliac bevel ending below in a raised edge causes the sacrum "to bite on the ilium here to a considerable extent, forming what is called in engineering nomenclature a joggle to the sacral 'voussoir.'" This prevents rotation of the ilium upwards. There is also a similar bevelled-off area on the posterior end of the horizontal limb of the iliac auricular area, covered by a projection at the corresponding point on the sacrum.

In addition a distinct elevation, sometimes an elongated rounded ridge, extending along the iliac auricular area, and following its curve, fits into a more or less well-developed elon-

[1] *Zeitsch. für Geburts. und Gynäk.*, 1881. [2] *Ann. de Gyn.*, 1899.

* Ridge on auricular area of Os Innominatum.

* Elongated groove (shaded dark) on auricular area of Sacrum.

[*Between pages* 76-77.

gated depression running along the sacral auricular area, and forming the arc of a circle whose centre is at a point coincident with that on which downward movement of the innominate bone on the sacrum occurs—namely, at the centre of action of the posterior sacro-iliac ligaments.[1] This groove and ridge are shown in the photograph of the sacrum and ilium.

Thus, as it were, a groove and slot arrangement is provided on the joint surfaces for rotation downwards, with a circular sweep of the innominate bone on the sacrum, and a joggle is provided at the salient auricular angles to check upward movement of the innominate bone, except so far as is necessary to recover its former position.

Again, the sacrum itself is wedge-shaped when looked at from three directions: (1) From the anterior aspect, with the base of the wedge at the promontory; (2) from above, with the base of the wedge at the anterior margin, and the apex towards the posterior margin, the sacrum being broader in front than behind, because of the salient auricular angle projecting as described, and because of the hollow posteriorly necessary to lodge the interosseous ligaments; and (3) looked at from the side, with the base of the wedge above. As a result, the auricular area of the sacrum looks outwards, downwards, and backwards, overhanging the iliac area, which faces in the opposite direction, and so preventing its movement upwards, and the sacrum, narrower behind and below, fits into an interval between the auricular areas of the ilia, which is narrower behind than in front.

From the preceding, it is evident that movement of the pubes downwards can, and does, occur as Walcher described. But it is limited, because the interval between the iliac surfaces is narrower posteriorly. Then, when we superadd pubic section, at once the range of the pubic descent is altered. For the uterine efforts are directing an expanding or outward, and a downward force on the brim, which can only take effect on the movable segment, the innominate bones rotating downwards at the sacro-iliac joints. When the symphysis is intact this movement must be limited, because the sacrum, being wider in front than behind, after a certain amount of pubic depression, the check is at once applied by the upper portion of the two

[1] Wood-Todd's *Encyclop. Anat. and Phys.*

iliac auricular areas coming in contact with the wider anterior portion of the sacral body. This is a consequence of the wedge-shape of the sacrum, and the corresponding shape of the interval between the two iliac articular areas into which it fits.

But divide the symphysis pubis, and at once the knot is cut which ties the bones together, and thus keeps intact the mechanism which checks the downward movement of the pubes. The parturient powers continue their downward and expanding action, and as a consequence the pubic bones separate from one another. But the distending action of the relatively small fœtal skull, acting anteriorly to the sacro-iliac joints, the effect is exaggerated at the pubic end and drives the pubes far apart. Thus is removed all bar to further pubic descent. In this way my contention is borne out that the first or outward movement of the pubes is unnatural, and is necessary merely for the descent of the pubes; while one scarcely wonders, as I shall show, that it adds little, as a rule, to the true conjugate.

While these movements — separation and descent of the pubes—are going on, the third movement has had its inception from the very moment of the pubic section. For the iliac crests follow the movements of the pubes, but in a diminishing degree as we pass backwards along them. Also the iliac crests are fixed to the rest of the frame by wide and strong muscular and ligamentous attachments; on the other hand, the ischia and pubes have no such attachments, all the muscles and ligaments attached to them, except along the upper margin of the pubes, being greatly slackened by the descent of the bones. Therefore there are two forces acting on the innominate bones: (1) the ligaments and muscles pulling on the iliac crests upwards and inwards; (2) the parturient powers acting on the bones downwards and outwards at the ischia and pubes. The resultant is a movement of the innominate bone on its long axis, so that the ilium, being more detained than the rest of the bone, moves less and becomes more erect with relation to the ischia and pubes and the vertical line.

The effect of this third movement is to increase the descent of the pubes; for just as the point of a hook, when the handle is rotated on its long axis, will dip, so the pubes, when the innominate bones are rotated in the manner just described, will dip.

Before proceeding further, I shall give a short outline of the effect of the separation of the pubes in increasing the diameter of the false pelvis and brim of the true pelvis.

The conjugata vera averaged 11·28 centimetres, or 4·4 inches, and the average increase was 1·67 millimetres per centimetre of pubic separation. I give a table below:—

Pubic Separation.	Increase in Conjugata Vera.
1 centimetre, or ·39 inch	1·67 millimetres, or ·065 inch
2 centimetres, or ·78 „	3·34 „ or ·13 „
3 „ or 1·17 inches	5·01 „ or ·195 „
4 „ or 1·56 „	6·68 „ or ·26 „
5 „ or 1·95 „	8·35 „ or ·325 „
6 „ or 2·34 „	10·02 „ or ·39 „
7 „ or 2·73 „	11·69 „ or ·455 „
8 „ or 3·12 „	13·36 „ or ·520 „

Roughly speaking, 6 centimetres of pubic separation give an increase of 1 centimetre. I may state in passing that if they are grouped according to the length of their conjugatæ veræ, in the pelves I examined, the longer the true conjugate the greater the increase for each centimetre of separation.

I must also note that no greater gain can be hoped for than that I have stated above by such incidents as a bulging of the fœtal head between the bones. Such an occurrence is not only impossible further than the natural convexity of the fœtal skull will produce, but would, if it occurred, be extremely dangerous to the structures most of all endangered in this operation. The fœtal skull can compact itself and adapt its outline to that of the brim. Where the brim is divided, it merely bridges across the gap, and maps out, as it were, the original line of the separated pubes.

The diagonal conjugate increased nearly 2 millimetres (1·8 millimetres) on an average per centimetre of pubic separation, the intertrochanteric over 6 millimetres, the intercristal 2·4 millimetres, and the interspinous 5·61 millimetres per centimetre of pubic separation. The transverse diameter of the brim increased 4 millimetres, and the right and left oblique diameters of the brim 3·84 and 3·9 millimetres respectively per centimetre of pubic separation.

An examination of these results shows that the diameters lying more or less transversely are increased greatly by each centimetre of pubic separation, and a very small amount of pubic separation will enlarge these sufficiently to let the fœtal head pass. But, unfortunately, it is more usually the true conjugate that presents the difficulty, and 6 centimetres of pubic separation enlarge that, on an average, only about 1 centimetre, or $\frac{2}{5}$ inch.

The question now arises, To which of these movements of the innominate bones are we to ascribe the benefit of the operation? Hitherto it has always been ascribed to the outward movement.

Now, the total average amount of increase that we are entitled to look for by a pubic separation of 6 centimetres is 1

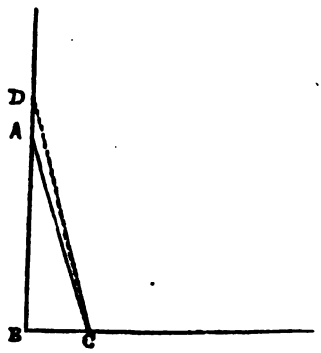


FIG. 4.

centimetre, or $\frac{2}{5}$ inch. This access of length can be divided into two portions: (1) that due to the descent of the pubes or relative elevation of the sacral promontory, and (2) that due to outward movement of the pubes. The third movement of rotation on a long axis merely increases the descent of the pubes, and therefore its value is included with that of the second movement.

By constructing a right-angled triangle ABC (Fig. 4) for each pelvis whose hypotenuse AC is equal to the true conjugate, and AB the perpendicular to the base is equal to the vertical height of the sacral promontory above the symphysis pubis, we get a fixed base BC. If, now, we reconstruct the triangle on the same base BC, but with the vertical height of the sacral promontory increased by the amount gained by 6

centimetres of pubic separation AD, the hypotenuse DC of this second triangle is equal to what the true conjugate would be were it increased only by descent of the pubes.

In my cases the conjugata vera averaged 11·28 centimetres, and the vertical height of the sacral promontory 10·24 centimetres. The increase of vertical height of the sacral promontory averaged 9·84 millimetres per 6 centimetres of pubic separation. Calculating as above, this amount of relative depression of the pubes would increase the true conjugate by 9·6 millimetres. But the total average increase for 6 centimetres of pubic separation, with all the movements counted in, is 10·02 millimetres.

Thus, by subtracting 9·6 millimetres from 10·02 millimetres, we get only 0·42 millimetre left to be accounted for by the outward movement of the pubes. So that the first movement increased the true conjugate by ½ millimetre, the second and third by nearly 1 centimetre.

An examination of each individual case gives the following result:—

Amount of Pubic Separation.	Total Increase.	Increase from Outward Movement.	Increase from Downward Movement.
7 centimetres	1·9 centimetres	0 millimetre	1·9 centimetres
4 „	1·0 „	1 „	0·9 „
3 „	·6 „	0 „	6 millimetres
5 „	1·0 „	4 millimetres	6 „
5 „	1·4 „	8 „	6 „
5 „	1·5 „	7 „	8 „
5 „	·5 „	? „	11 „
3 „	·5 „	? „	7 „
4 „	·8 „	2 „	6 „
7 „	1·5 „	10 „	5 „
7 „	·6 „	? „	11 „
8 „	·5 „	0 „	5 „
8 „	1·3 „	4 „	9 „
8 „	1·5 „	11 „	4 „
8 „	1·7 „	5 „	12 „
8 „	1·15 „	5·5 „	6 „
8 „	1·0 „	6 „	4 „
7 „	·8 „	3 „	5 „
8 „	·8 „	·5 „	7·5 „
8 „	1·3 „	8 „	5 „
7 „	·8 „	? „	13 „
6 „	1·0 „	? „	13 „
7 „	·9 „	2 „	7 „

In five cases outward movement accounted for most of the increase.

Total Average Amount of Increase per 6 centimetres of Pubic Separation.	Proportion of Total Increase due to	
	Outward Movement.	Descent of Pubes.
1·8 centimetres	4 parts (1 centimetre)	3 parts (·8 centimetre)
1·2 „	2 „ (·8 „)	1 part (·4 „)
1·2 „	11 „ (·88 „)	4 parts (·32 „)
·9 „	3 „ (·54 „)	2 „ (·36 „)
·8 „	5 „ (·5 „)	3 „ (·3 „)

In ten cases descent of the pubes accounted for most of the increase.

Total Average Amount of Increase per 6 centimetres of Pubic Separation.	Proportion of Total Increase due to	
	Outward Movement.	Descent of Pubes.
1·5 centimetres	1 part (·15 centimetre)	9 parts (1·35 centimetres)
1·2 „	2 parts (·48 „)	3 „ (·72 „)
1·8 „	7 „ (·84 „)	8 „ (·96 „)
1·2 „	1 „ (·3 „)	3 „ (·9 „)
·96 „	4 „ (·3 „)	9 „ (·66 „)
1·2 „	5 „ (·34 „)	12 „ (·86 „)
·84 „	5½ „ (·31 „)	6 „ (·5 „)
·6 „	3 „ (·23 „)	5 „ (·37 „)
·6 „	½ „ (·03 „)	7½ „ (·57 „)
·6 „	2 „ (·14 „)	7 „ (·46 „)

In three cases the descent of the pubes accounted for all the increase.

In five cases the amount of increase that the true conjugate should theoretically have derived from the pubic descent was greater than that actually derived by the total effect of all three movements. In order to account for these cases, it must be explained that where the shape of the brim is more circular than elliptical, the effect of the outward sweep of the pubes is to carry the interpubic line posterior to the original site of the symphysis pubis, because the pubes were already situated on the most anterior points of the circumferences of the circles

they are describing. Thus the outward movement would really detract from, instead of increasing, the conjugata vera. Consequently, in certain cases, with a circular brim, symphysiotomy from the point of view of the outward movement is actually harmful as regards the true conjugate.

We may now state (1) that the outward movement or separation of the pubes (*a*) increases the true conjugate, being more often the minor than the major factor in the increase; (*b*) sometimes actually lessens the true conjugate; (*c*) increases greatly the diameters lying in a more or less transverse plane. (2) That the downward movement of the pubes, on the other hand, has for its function (*a*) the increase of the true conjugate, being usually the major factor, seldom the minor factor, and sometimes the only factor in its increase; (*b*) increased safety, as this movement is less dangerous than outward separation of the pubes.

From the preceding statements it appears that the true significance of the division of the pubic symphysis during labour, in order to increase the true conjugate of the pelvic brim, lies mainly in the fact that it thereby permits increased descent of the pubic bones from their previous horizontal level. This would lead to the conclusion that symphysiotomy is really a means of obtaining greater effects than we can by Walcher's position, and we may test this by a rough comparison with the results of Walcher's position.

Lebedeff and Bartoszewicz,[1] experimenting on twenty-five adult and two infant pelves, obtained an increase of the true conjugate of 3 millimetres; Bonnaire and Bué of 3 to 4 millimetres by Walcher's position. An increase of the true conjugate of 4 millimetres in an average pelvis represents a descent of the pubes of 5 millimetres. Therefore Walcher's position can only depress the pubes to a *maximum* of 5 millimetres, whereas by symphysiotomy with 6 centimetres of pubic separation the *mean* depression of the pubes is 8·4 millimetres.

But if Walcher's position and symphysiotomy are both used, the result is a pubic descent of 5 millimetres (maximum, Walcher) + 8·4 millimetres (mean symphysiotomy). For in his paper "On the Set of the Pelvis in the Body," Dr Barbour,[2]

[1] *Ann. de Gyn.*, 1899. [2] *Trans. Edin. Obstetrical Soc.*, vol. xxv.

using my measurements of the vertical height of the sacral promontory, shows that "the effect of opening the abdomen and detaching the muscles is to increase the angle of the set of the pelvis." In other words, pubic descent had taken place because of the necessary preliminaries to the research. So that I had started my measurements with the pubes already depressed, as by Walcher's position; and therefore all the pubic descent that my measurements showed was entirely due to the symphysiotomy.

For symphysiotomy to be a successful operation we must choose only suitable cases. To choose suitable cases we must know (1) what gain in the conjugata vera a given amount of separation of the pubes will yield—this I have fixed at an average of 1·67 millimetres per centimetre of pubic separation; (2) what amount of separation of the pubes is safe. From these two data we may decide whether the conjugata vera will be sufficiently increased by a safe amount of pubic separation to let the fœtal head pass.

In order to get at the second point, I shall consider, in my twenty-eight cases, each portion of the pelvis separately.

The *sacro-iliac joints* are affected as follows: The movements at the pubes are all reflected in miniature at the sacro-iliac joints, so that the bones are separated from one another anteriorly. The separation is always widest between the salient angles of the auricular areas, and the upper margin of the lateral mass of the sacrum increasingly projects above the corresponding upper border of the iliac articular surface.

The *posterior sacro-iliac ligament* binds the bones together posteriorly, and forms the centre for the downward movement. It always remains intact.

The *anterior and superior sacro-iliac* ligaments suffer most; they are very apt to tear. This tear begins in every case in the superior ligament, just posterior to a line joining the salient angles of the articular surfaces. It may appear elsewhere almost immediately, and when separation of the pubes is continued beyond the amount at which it began to appear, it passes in both directions from that point. The tear starts at this point because of the projection of the auricular area of the sacrum at the salient angle, above the level of the auricular area of the ilium, throwing greater strain on the ligament here.

The amount of separation required to cause rupture varied in the experiments, occurring earliest in nulliparæ, later in parous women, and being very little apt to occur in pregnant or parturient pelves. Reference to my thesis will give details, but here it will suffice to state that in 44 per cent. the rupture began below 6 centimetres of pubic separation, while in 56 per cent. it began at or above that point. In two it began only at 8 centimetres, and in one not even at 8 centimetres. The *tissues in front of the joints* are not greatly strained.

The *mons veneris* in many cases was greatly affected. In spite of the slackening of the tissues by the abdominal incision and by their separation from the innominate bones, the incision was very apt to extend downwards into the mons veneris. After 4 centimetres of pubic separation, a great strain was thrown on it; after 7 centimetres it always tore.

The *vulva* also was greatly affected by the separation of the pubes. In only one case, that of a multipara, did an actual tear occur; but in every case, as the distance between the pubes increased, so did the stretching of the tissues between them, especially of the vestibule. At and after 7 centimetres of pubic separation the structures between the anterior parts of the labia majora were stretched like a drum between the separated pubes, and were thrown into ribbed folds or corrugations, like those in corrugated iron. With lesser degrees of separation a less damaging condition of affairs existed. Up to 5 or 6 centimetres the strain was borne well; after 7 centimetres it was evident that there would be a great risk of sloughing of the stretched tissues.

The *bladder and urethra* were not affected. The strain, of course, is thrown transversely across the urethra, and not along it. Thus it escapes, unless when a tear occurs.

The *vagina* is only affected at its orifice, as I have described in connection with the vulva.

Having considered the effect of pubic separation on the various parts of the pelvis, I shall consider what amount of pubic separation is safe in each respective part.

Authors give various opinions as regards the sacro-iliac joints. V. Cocq[1] says that the maximum amount of separation

[1] *Journ. de Méd., de Chirurg., et de Pharm.*, 1893.

of the pubes with safety to the sacro-iliac joint is 6 centimetres; Pinard says 6 centimetres; Döderlein and Morisani found no lesion of it with 5 centimetres. The dangers have been variously stated as "suppuration of sacro-iliac joints," "caries," and "non-union."

My own opinion is that the *danger of pubic separation has no reference at all to the sacro-iliac joints;* that therefore we need not limit the amount of pubic separation if it were not for the sake of other structures; for rupture of the anterior and superior ligaments is of little consequence, and would not delay healing, while the strong posterior ligaments and the strong sacro-sciatic ligaments are never in any danger of rupture, being relaxed, not tightened.

Reference to recorded cases will support this statement. Among over 300 that I collected between 1892 and 1898 no such sequelæ as suppuration or caries or non-union occurred in the sacro-iliac joints. There has been recorded, as in Koffer's case performed March 6, 1893, pain persisting for some time in these joints, but no more.

It is recorded that in cases where the patient died soon after the operation there was rupture of the anterior ligaments; but this, I am sure, would never have been known but for the patient's death so soon after the operation, and from some other cause.

So that I conclude that the danger of pubic separation after symphysiotomy lies not in the sacro-iliac joints, the tissues near the joints, nor *per se* in the bladder, urethra, or vagina, but in the vulva, especially the vestibule; and in the extension of vestibular tears to the adjacent anterior wall of the vaginal orifice with its contained urethra, and to the bladder; and that the maximum amount of pubic separation should not exceed 6 centimetres. But that the danger lies in and around the symphysis pubis is amply confirmed by experience. Thus, of lacerations which occurred in 30 cases, 5 times they were due to extension of the operation-wound, 7 times to tear of vestibule, once to tear of labium minus, 9 times of anterior vaginal wall, 3 times of urethra, none of bladder alone; of vestibule, clitoris and urethra 2, of urethra and vagina 1, of urethra into vagina and bladder 1, of urethra, vagina, cervix, and perineum 1. Most of the other

complications and sequelæ are from preventable causes. Thus, in 7 cases the lacerations were not due to the symphysiotomy, but came from the mismanaged labour. Hæmorrhage occurred in 38 cases: from the operation wound 8, from corpora cavernosa clitoridis 9, from vessels of bladder 2, from varicose veins of vulva 1, from venous sources 6, from torn cervix 1, and in the third stage and post-partum 11.

The limitation of pubic separation to a maximum of 6 centimetres is also justified by experience. For over all the cases (170 out of 300) where the amount of pubic separation was recorded, the maximum averaged 5·6 centimetres. In only 6 were the pubes separated over 7 centimetres. These had respectively a separation of 7·5, 8, 8, 9, 10, and 12·5 centimetres. The first two and the last had an uncomplicated recovery. The third (8 centimetres) had a tear of the vestibule, and died of sepsis. The fourth (9 centimetres) recovered, but a crack was heard during the separation, in the sacro-iliac joint. The fifth (10 centimetres) had the urethra ruptured, and died of hæmorrhage from the operation-wound and post-partum.

I am now in a position to state the practical results of my study:

1. Since 6 centimetres of pubic separation is all that we can allow, the utmost amount of increase of the true conjugate we can aim at is 1 centimetre, or $\frac{2}{5}$ inch. Therefore the cases must be strictly limited to those in which, by an addition of $\frac{2}{5}$ inch to the true conjugate, we can *with safety to the mother* deliver a *living* child by nature alone, or aided by forceps or version. Therefore our cases must be limited to such as, with a pubic separation of 6 centimetres as a maximum, will have the length of their true conjugates raised to $3\frac{1}{4}$ inches at the least. If we subtract $\frac{2}{5}$ inch from $3\frac{1}{4}$ inches, we get $2\frac{7}{8}$ inches, or 7·3 centimetres.

Therefore symphysiotomy should never be performed unless there is a true conjugate of at least $2\frac{7}{8}$ inches. That this is the minimum conjugate is abundantly evident from the literature of the subject; and, finally, Morisani states that there is not much scope for the operation with a conjugata vera below 7 centimetres.

2. The child must be living.

3. Walcher's position must be used, and, as far as possible, maintained, together with support to the sides of the pelvis.

4. It is necessary in some cases to counteract unequal movement on the two sides of the pelvis. Cases have been recorded where one side of the pelvis moved more than the other side. Thus one pubic bone comes to lie on a plane posterior to the other, and forming a relative projection into the brim of the pelvis, the bladder and vagina come to be squeezed between it and the fœtal head, and perforation of the bladder or anterior vaginal wall may result. In many of my cases I noticed this tendency to unequal movement on the two sides of the pelvis. In these cases the block of wood pushed between the pubes used the non-moving side as a fulcrum from which it pushed the other side. Then the anterior and superior sacro-iliac ligaments on the moving side stretched more and more, and very soon yielded.

Thus it appears that once this asymmetrical movement is set up, it very soon causes rupture of ligaments on that side. In addition, as in cases recorded by Harris and Jarman, perforation of the bladder or anterior vaginal wall may result, while the fœtal head is deeply grooved.

In order to arrest this asymmetrical movement, a departure from Walcher's position is necessary. By flexing the thigh of the non-moving side, and abducting the bent-up knee, that side can be made to move equally with the other side, and the rupture of the ligaments can thus be avoided or delayed. In such cases, therefore, this position can be used.

5. The knife used to sever the symphysis should be a broad-bladed one, otherwise there will be difficulty with the division of the symphysis pubis.

6. Division of the subpubic ligament should not be aimed at, although the symphysis must be completely divided. The subpubic ligament offers some resistance to the pubic separation, and if left untorn prevents the extension of the wound down into the vulva, just as the hem of a handkerchief prevents the linen from tearing.

7. Ossification of the cartilage does not occur—at least I never found it, even in subjects as old as seventy years. Wehle also doubts its occurrence from age. And this leads us to the

importance of localising the upper end of the symphysis pubis. For if the joint is missed, not only is there great delay, but also, as Harris states, the detached end of the pubic bone necroses, and a fistula is the result. Indeed, I am persuaded that in those cases where the joint is said to be ossified, it has merely happened that the joint has been missed and the bone severed. Lewers of London (February 1893) operated on a case, and had recourse to the saw to divide the symphysis. Necrosis occurred as a result. It is not always the case that the joint is in the median line at its upper end. In twenty-four of my cases, 50 per cent. had the upper end in the median line, $33\frac{1}{3}$ per cent. to the left of it, and $16\frac{2}{3}$ per cent. to the right. In sixty cases Wehle found that $13\frac{1}{3}$ per cent. had the joint in the median line, $66\frac{2}{3}$ per cent. to the left, and 20 per cent. to the right of it.

All that one can state is that if the upper end of the symphysis is not in the median line, it is more probably situated to the left than to the right. But it is always quite easy to find the upper end, because there is a fibrous thickening forming a tubercle on its summit, from which a ridge marking the line of the joint passes down the posterior aspect of the symphysis. So that by feeling along the upper edge of the pubic bones for this tubercle one can always find the upper end of the joint.

8. Finally, looking to the number of deaths from sepsis, and to the frequency of localised septic infection, rigid asepsis is necessary for the operator. And since so many fatalities from sepsis occur in patients with a previous foul vaginal discharge, the existence of such foul discharge should be looked upon as a contra-indication to the operation.

The President said that the Society was indebted to Dr Sandstein for having sent them a most interesting and valuable paper, and to Professor Simpson for having advised that it be brought before the Society. He doubted whether Dr Sandstein's method of separating the pubic bones by means of wedges was the most satisfactory. Wehle screwed the sacrum to an upright post, so as not to interfere with the posterior movements of the ossa innominata, and caused the separation by drawing a body through the inlet. Wehle ascribes much more importance to the separation of the pubic

bones than Sandstein does, and shows that by the projection of the fœtal head at the separated area there is a gain of about one centimetre. Sandstein attaches most importance to the downward movement of the symphysis, and describes a movement not hitherto noticed, viz., round an antero-posterior axis, whereby the downward movement is further increased. He thought that the chief value of the paper was that it indicated the limited sphere of usefulness of symphysiotomy.

Professor Simpson said it was an extremely interesting communication. He had the satisfaction of reading the thesis in its entirety, and did not wonder that a gold medal and special prize had been awarded to Dr Sandstein. To his mind Dr Sandstein had established the point that the importance of the division lies not alone in mere separation of the pubic bones, but in the descent capable of being brought about so as to increase the sacro-pubic diameter. He was not quite convinced of the correctness of his reasoning with regard to the adaptation of the head to the open part between the symphysis pubis. Dr Sandstein insists that there is no advantage because of the head getting between the pubic bones. He himself was not quite clear that the projecting part of the head of the child might not fit in, and so more easily pass through. He was strongly impressed with the importance of the observations as to the limitations of the operation. It was not one to be carried out widely and vaguely, but with clear impressions of the relative size of the pelvis, and the advantages that can be obtained from the division of the symphysis, because it is a procedure attended with dangers of its own. He confessed he had never seen a case in which he felt they were likely to get sufficient advantage from the operation to allow the patient to incur the dangers. The paper was a very valuable contribution to the *Transactions*, and it was because he had recognised the importance of the original observations made by Dr Sandstein that he had asked him to give them this paper upon the subject.

Dr J. W. Ballantyne said that one of the chief ends of the paper would be that it would reach the home of symphysiotomy abroad, where at present the tendency seemed to be to slacken in keenness for the operation. The tendency to reinstate the

induction of premature labour seemed to be supported by the much better results obtained with regard to the rearing of premature infants, in whom the mortality now was only a little over 6 per cent. in some of the Obstetric Cliniques of Paris.

Dr Berry Hart said there was increase in the actual space when the pubic ends were separated, and it did not seem very fair to take the mere anatomical conjugate. That he would be inclined to agree with Morisani. The pubic bones must straighten out a little, and there would thus be an increase in the actual area. There was a great deal of work in the paper, and it was very valuable.

VI. CASE OF FULL-TIME INTACT EXTRAPERITONEAL GESTATION SUCCESSFULLY REMOVED AFTER FIVE YEARS' RETENTION.

By D. Berry Hart, M.D., Gynæcologist to the Royal Infirmary, Edinburgh.

I have thought this case worthy of record as an instance of a rare condition, and because it affords me an opportunity of restating and amplifying some facts I have already published relative to advanced extra-uterine gestation.

The case is briefly as follows:—

Mrs D., æt. 29, married, housewife, residence Oban, admitted to Ward 36, Royal Infirmary, on the recommendation of Dr Baily, complaining of swelling of the abdomen of about five years' duration.

History.—After one year of married life she thought herself pregnant. At that time amenorrhœa had begun to be followed by morning sickness and by vomiting, which persisted till the end of the fourth and a half month, when quickening was felt. Her breasts had rapidly enlarged, and were full of milk, and a swelling filled the lower half of the abdomen. At the end of the seventh month she had a fright, seeing, as she thought, a woman who had been some time dead. With this fright she had violent palpitation, and henceforth no more fœtal movements were felt. In the meantime her abdomen continued to

enlarge up to the end of the eleventh month after the last menstruation. She was then so swollen that she felt ashamed to go out in public. One day at the end of the eleventh month a severe flooding came on, but when the doctor was summoned she was told, to her surprise, that no child could be born. No account of the discharge of a decidua could be obtained, only blood-clots being noticed. This flooding lasted for twelve hours, and she then passed a large amount of flatus *per anum*. Her abdominal swelling after this greatly disappeared, leaving behind, however, a marked enlargement, which has remained *in statu quo* for these last four years, during which time she has enjoyed remarkably good health, and menstruated regularly. No sudden attack of pain was ever felt in the early months. What really induced her to come into the infirmary was a recurring pain, due, she believed, to an accidental blow.

Sexual History.—Menstruation appears to have been normal, of twenty-eight day type, seven days' duration.

Pregnancies.—She has never had any full-time child, nor any abortion. She believed herself pregnant when she had the eleven months' amenorrhœa. During this time she had little or no disturbance of bladder or rectal function, except from hæmorrhoids. During the first few years after the flooding she suffered from a gnawing pain, which she attributed to the weight of the tumour.

Physical Examination: General Appearance.—She appears to be a healthy woman, and her mucous membranes are well coloured, although she is somewhat sallow. The mammæ are flaccid and soft, as if they had been larger previously; the areolæ large and very dark, and Montgomery's tubercles are present.

Abdomen: Inspection.—The skin over the lower part has well-marked *striæ gravidarum*. Reaching as high as the umbilicus, and occupying the whole of the hypogastric and part of the iliac and umbilical regions, is a well-defined swelling, rounded in shape, and inclining slightly to the left. No irregularity is seen on the surface.

Palpation.—The abdominal walls are soft and flaccid, and through them a tense yet elastic swelling can be palpated, about the size of a six-months' pregnancy. It is felt to rise

out of the pelvis, and is perfectly smooth and rounded in contour. If anything, it is felt to be more prominent on the left side. A little tenderness is felt on pressure at the spot where the accidental blow was sustained. Fluctuation can be made out, but there is no thrill.

Percussion.—A dull note is got from a point 1 inch above the navel to the symphysis pubis below, and laterally from a point 3 inches internal to the right anterior superior spine to a point 2 inches internal to the left one. On auscultation, no bruit of any kind can be heard.

Mensuration. — Circumference at anterior iliac spine, 39 inches; at level of umbilicus, 39 inches; at level of costal margins, 31 inches; from right anterior superior spine to navel, $7\frac{3}{4}$ inches, with a left corresponding measurement of 7 inches.

On *vaginal examination,* nothing special was felt as to the walls. The cervix was fairly high up, and in the left and posterior fornices some bulging was felt; while in the posterior fornix a peculiar crepitation was noticed, such as one feels in subcutaneous emphysema. The os externum is apparently nulliparous. The uterus, apparently normal in size, lies in the middle line, and feels as if the fundus ran into the anterior wall of the abdominal cyst. Bimanual palpation of the cyst confirms the description already given.

Remarks on Diagnosis.—In this case the diagnosis of retained extra-uterine gestation was arrived at for the following reasons:—The history showed—(*a*) Amenorrhœa and all the symptoms of early pregnancy; (*b*) there was a spurious labour, although a decidua was not observed to be discharged; (*c*) the tumour shrank to a certain extent, and remained quiescent for about four years after the spurious labour.

The question arose prior to operation as to the trustworthiness of the woman's account. Might she not have made a mistake in her sensations, and had a rapidly-growing extra-peritoneal cyst with a coincident accidental amenorrhœa? May she, in short, not have deluded herself as to the fact of pregnancy? I cross-examined her very carefully, and came to the conclusion that the history could be relied on. The "vision" is allowable in the Celt, and did not seem to me to detract from the trustworthiness of her account.

The physical signs were those of a cyst lifting up the posterior laminæ of the broad ligaments, and the peritoneum on the posterior wall of the uterus. The crepitus was a remarkable feature, and seemed to me to indicate that there was a connective-tissue base to the cyst, and that gases might be passing from bowel to cyst, as we know probably happens. One would have expected, however, a discharge of bones by the bowel, bladder, or abdominal wall, as so often occurs in such cases, especially where the placenta lies above the fœtus, is thus displaced up, and converted into a mass of blood-clot and crystals, to which infection from the bowel passes. I have already, in another paper, considered the causation of such bone-discharge, and need not enlarge on it at present. What prevented it in this case was probably the fact of the sac not touching the large bowel at any extraperitoneal part.

Whatever might be the diagnosis, abdominal section was indicated, and I accordingly performed it.

On making the usual incision, I opened the peritoneal cavity, and came on a bulging cyst whose surface was evidently peritoneal, and with a somewhat thin wall in which ramifying vessels could be seen. On passing my hand in, I was able to note the peritoneal reflexion, and found it as follows: On the right lateral aspect the dip was normal; behind, it stopped at the promontory; at the left side it was on a level with the iliac margin; while in front it dipped normally and as deeply as usual. It could be noted that the anterior wall of the cyst and the fundus uteri were continuous, and that the peritoneal reflexion on the left dipped rapidly down in front to the vesico-uterine pouch. The cyst wall was now laid hold of in front, on each side of the middle line, with locking-forceps, and the cyst opened between these by a vertical incision. On passing in my finger, I at once touched fœtal bones, and a thick inodorous brown fluid began to escape freely. Great care was taken to prevent the passage of this into the peritoneal cavity while the bones were being removed piece by piece. They were the bones of a full-time fœtus in an admirable state of preservation; indeed, little needed to be done to make them a museum specimen. I reserve to a subsequent part of the paper a description of their condition.

The sac was now carefully swabbed out, and all fluid removed. In my anxiety not to contaminate the parts, I, unfortunately, did not instruct the nurses to preserve the fluid —an omission on my part I regret exceedingly. On further exploring the cyst-interior with my finger, I could discover no evidence of, or trace of, placenta, cord, or membranes.

The sac could not be enucleated or removed as a whole, and I therefore stitched the opening in its wall to the abdominal wound, closing off the peritoneum in the usual way. I then packed the sac interior with iodoform gauze wrung out of weak biniodide of mercury, bringing the end out on the abdominal surface. The lining of the sac was soft and shreddy in structure.

The patient made an uninterrupted recovery. The discharge remained scanty, and free from odour. No placental débris came away, but one metatarsal bone was passed by the sinus. She was discharged, with a small sinus present, on 3rd October 1901.

The following is a description of the fœtal skeleton (by Dr George Robertson, resident surgeon, Ward 36):—

The bones which make up this rare specimen were in a remarkable state of preservation when removed from the gestation sac. A large number of them lay free in the fluid which the sac contained, and the rest were removed by hand or by swabs. The base of the skull, however, was still articulated, while the bones of the face were covered by the skin and tissues, the eyes, ear, nose, mouth, and tongue being easily seen. The upper part of the thorax and the neck of the fœtus were fairly well preserved, and continuous with the remains of the skull and face. One arm, intact as far as the wrist, was attached to the thorax; it was covered with skin, but the hand was absent. The thorax was collapsed, all the ribs having escaped into the sac. One of the legs was covered here and there with skin and muscle. It was in this limb that the only epiphysis of hyaline cartilage was found, and this showed no trace of the ossific node usually found here in a fœtus at full time.

The bones found free in the sac were carefully collected, washed clean, and those with tissues were scraped, washed,

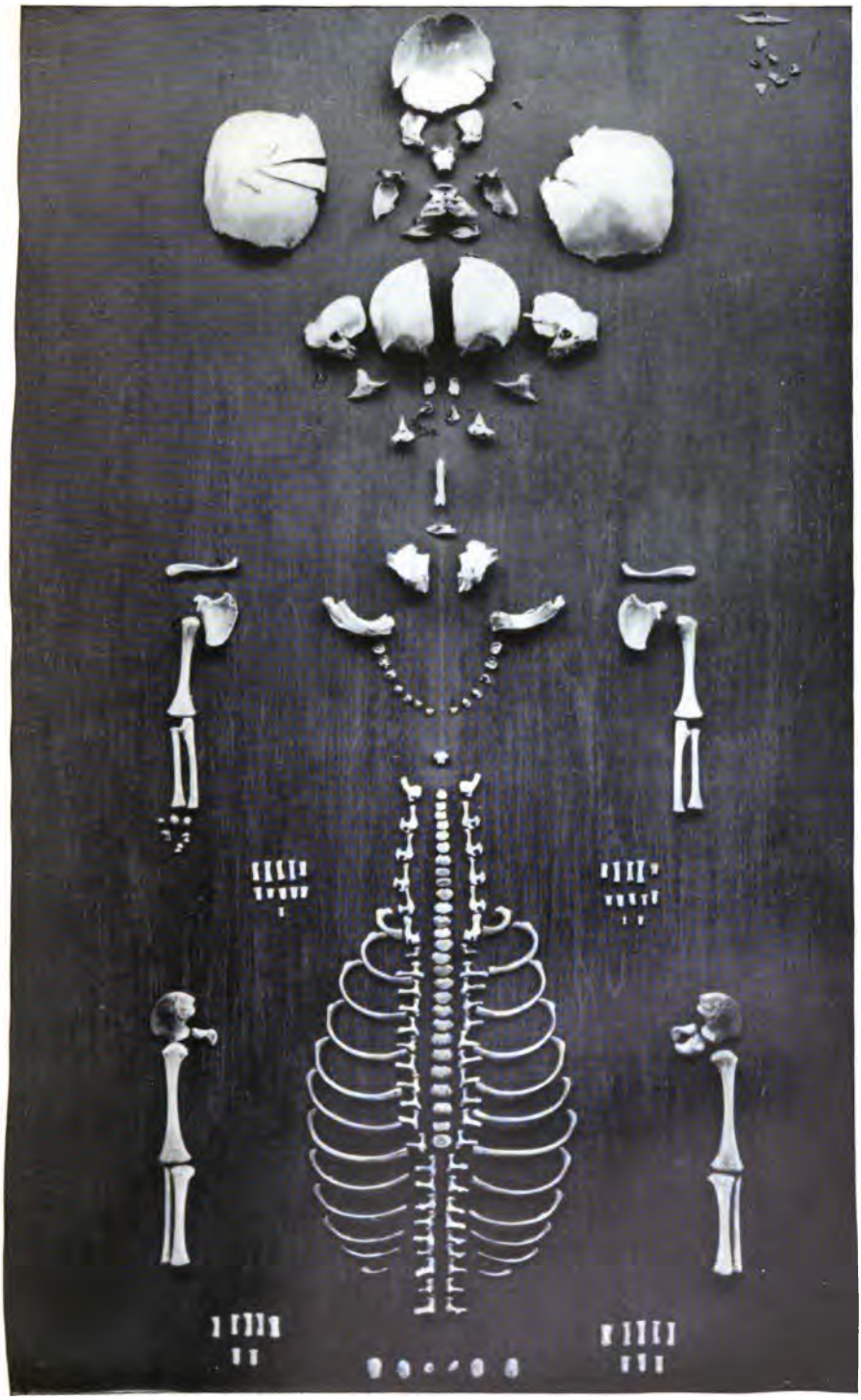
and dried. When arranged in the definite order of the skeleton (*vide* plate from photograph), an almost complete skeleton was put together. The bones present are:—

(*a*) *Head and Face.* 1. Occipital bone; the basi-occipital and the condyles in two separate pieces.
2. Sphenoid bone; body and lesser wings together, greater wings separate.
3. Two parietal bones; the right broken in removal.
4. Two frontal bones.
5. The ethmoid bone in two halves.
6. Two temporal bones; the left, with the middle ear and the three ossicles, in position. The right middle ear is empty, and only the stapes present.
7. Two malar bones.
8. Two lachrymal bones.
9. Two nasal bones.
10. The vomer.
11. One middle turbinated bone.
12. Two superior maxillæ, with teeth present in a few of the alveoli.

(*b*) *Thorax and Vertebral Column.*—1. Manubrium stern lost; first division of gladiolus sterni present.
2. Twenty-four ribs.
3. Twenty-six bodies of vertebræ.
4. First segment of sacrum; no alæ present.
5. Twenty-six pairs of laminæ of vertebræ; no intervertebral discs were present.

(*c*) *Extremities.—Upper:* 1. Right and left clavicle.
2. Right and left scapulæ; coracoid process lost on both sides.
3. Right and left humeri.
4. Right and left ulnæ.
5. Right and left radii.
6. Five carpal bones of the right hand.
7. Metacarpals and phalanges of right and left hands. No epiphyses present.

Lower: 1. Os innominatum on each side. Ilium, ischium,



Skeleton of Fœtus retained Five Years in an Extraperitoneal Sac.

[*To face page* 96.

and pubes separate, and all present on the left side but ischium absent on right side.

2. Right and left femora.
3. Right and left tibiæ.
4. Right and left fibulæ.
5. Six tarsal bones, three on each side.
6. Metatarsals and phalanges of right and left feet. Only one epiphysis found as hyaline cartilage, lower end of femur.

Unknown.—A few broken fragments of bone were found whose position in the skeleton could not be settled. They are in all probability, from their delicate nature, pieces of the walls of the ethmoidal and sphenoidal sinuses.

Explanatory Comment.—This gestation had begun in the left tube, developed between the layers of the left broad ligament, and then so grown that it lifted up the peritoneum from the posterior wall of the uterus, and also insinuated itself between the layers of the right broad ligament. It thus practically lifted up the posterior pelvic peritoneum, and is, in Taylor's nomenclature, "posterior tuboligamentary," or it might be described as an "intact extraperitoneal form with posterior lifting of peritoneum." One extraordinary feature is the almost entire absorption of the soft tissues. All the soft tissues—skin, muscles, viscera, brain—had become disintegrated or had disappeared. The exceptions have been already noted. No trace of placenta, cord, or membranes was found. This absorption had not happened in the peritoneal cavity, which is usually credited with unusual absorptive powers, but in an artificially-formed connective-tissue space. There was no putrefaction, no fœtor, and during all the four years following the death of the fœtus and its slow breaking up, no disturbance of the patient's health.

I now wish to make some remarks on extraperitoneal pregnancy, especially as it has been misunderstood in some of its aspects.

A point long at issue was the origin of advanced extrauterine gestation. The current opinion in the seventies, even now held by many, was that it was intraperitoneal in origin

and development—*i.e.*, that the villi of the chorion had actually grafted on the free surface of the peritoneum, which therefore acted as a serotina. In 1889 Matthews Duncan stated his opinion in the following words: "Every author on this subject recognises the peritoneal insertion of the placenta, and in every such case it is, I believe, the original insertion." The only vigorous opponent of this pathology was Lawson Tait, who strongly supported Dezeimeris' view that there was a broad ligament or subperitoneal form at mid-term. Tait very clearly recognised the extraperitoneal form as early as 1877, and in his text-book wrote as follows: "If, however, the sac be found to be covered by peritoneum—that is, if the case be one of the extraperitoneal variety . . . in such a case the peritoneum will be found lifted up from its usual relations, so that it runs on the walls at a much higher level than is usual." This was a remarkable clinical fact, and Tait deserves the highest credit for it. It must be remembered that he had the whole weight of specialism against him. In 1887 I was fortunate enough to obtain a cadaver where advanced extra-uterine gestation was present, and along with the late Mr Carter, anatomical lecturer, Glasgow, examined it sectionally after freezing, the sections all being sagittal-mesial and sagittal-lateral. We were thus able to make out the peritoneal relations of the gestation very accurately. These were really somewhat complex. We established (1) that the gestation was extraperitoneal and not intraperitoneal (this was the great fact, and still remains the main feature of such gestations, viz., that the fœtus and placenta are extraperitoneal, or if the fœtus should have broken through into the peritoneum, the placenta is still attached to the extraperitoneal connective tissue, or may be in the tube); (2) that the placenta was displaced up to about 9 to 10 inches (25 centimetres) on the right side of the anterior abdominal wall; (3) that the placenta was a mass of blood-clot and distorted villi; (4) that the important peritoneal relation was on the right side, where it was lifted up about 10 inches above the pubes.

The peritoneum may be lifted up posteriorly, as Dr Taylor of Birmingham has pointed out in his valuable Ingleby Lectures. We can thus speak of extraperitoneal gestation with (1) pos-

terior lifting of peritoneum, and (2) with anterior lifting of peritoneum.

The case I have recorded is thus one of those Taylor has drawn attention to. The most remarkable feature in the case I have been unable to explain. One can only marvel at the resources of Nature, and puzzle how a full-time fœtus and its appendages were in an artificially-formed connective-tissue space disintegrated and preserved aseptic for such a long period.

LITERATURE.

VAN CAUVENBERGHE—*De la grossesse extrautérine*, Bruxelles, 1867.

DORAN, ALBAN—"A case of Extraperitoneal Gestation, in which Fœtal Death occurred at the Eighth Month after Spurious Labour; Abdominal Section two months later," *Transactions of the Obstetrical Society, London*, vol. xlii., p. 213.

DUNNING—"Ectopic Gestation," *Amer. Jour. of Obst.*, vol. xxxvi., p. 43.

HART and CARTER—*Selected Papers in Gynæcology*, Edinburgh and London, W. & A. K. Johnston.

LOARING, H. J.—*Epitaphs: Quaint, Curious, and Elegant*, London, William Tegg (no date). In this curious work the following epitaph is given:—

"In Père-la-Chaise Cemetery is the annexed inscription:

MADAME MILCENT,
Died March 10, 1824, aged 38 years.
Her death was accelerated by long sufferings,
Which she bore with great courage.
She carried in her body a child for eight years;
Twelve months living and seven years dead.
To prove the truth of this, Docters Dubois and
Belivier extracted it at her decease, when it
Was found well formed and
Perfectly preserved."

TAIT, LAWSON—*Diseases of Women*, London and Edinburgh, Williams & Norgate, 1877.

TAYLOR, J. W.—*Extra-uterine Pregnancy*, London, H. K. Lewis, 1899.

Professor Simpson said that cases of this sort came under observation when the bones had begun to make their way out. He had showed a pretty complete skeleton of that sort, of a negro woman, where bone after bone had come out. He did not know that this case was quite unique, because cases are found often enough where women have lived many years after an extra-uterine gestation, in which bones have been found in the sac, and the soft parts of the child have all disappeared. He did not quite remember at the moment if there was not a case recorded where the abdomen has been opened and the bones removed in the way described by Dr Hart. It was an extremely interesting question Dr Hart had started, as to how the absorption and disappearance of the soft parts took place. It could be understood in an early extra-uterine gestation, when the parts were quite soft, because there were cases where the entire ovum seems to have been absorbed, and the tube to have recovered its functional activities. But how in the more advanced cases, skin, muscles, etc., disappeared, was a problem that wanted solution, and, as Dr Hart has suggested, the chemical analysis of the grumous contents of the cyst might have helped us to understand it a little better. He congratulated Dr Hart on the very well recorded case, and upon the happy result of the operation.

Dr Haultain said the only point he would consider of practical importance was that, from the fact that there was retention of this body in the sac, and absorption without any decomposition of pathological nature, so far as to interfere with the health of the patient, the question was raised as to whether it was not almost an indication that in operating on these cases it was necessary simply to remove the child, and do nothing more but stitch up the sac. He did not understand why there should be septic infection in some cases and not in others. There were one or two cases on record where the sac was simply stitched up without removal of placenta, and he did not see why this was not preferable to attempting its removal, especially as one knew there was this absorption going on, and in view of the great mortality in those cases where removal was attempted, especially in cases where the placental circulation was not inhibited. As to the question of absorption,

he did not see why there should not be a considerable amount of lymphatic absorption through the connective tissue at the base of the sac. It was an extraperitoneal condition, and one knew the power there was of absorption of ordinary inflammatory deposits, and after a long period he thought it was only what might be expected, that with the disintegration of the tissues there must be considerable absorption.

Dr J. W. Ballantyne said that he thought that perhaps some of the recent observations on the liquor amnii, from which it seemed quite possible that there was a circulation of liquor amnii through the amnion, might throw some light upon the absorption of the tissues to which Dr Hart had referred in his paper.

VII. EXPULSION OF DERMOID OVARIAN CYST *PER VAGINAM* DURING LABOUR, WITH A DISCUSSION ON THE OPERATIVE TREATMENT OF PELVIC OVARIAN TUMOURS COMPLICATING LABOUR.

By F. W. N. HAULTAIN, M.D., F.R.C.P.E., Lecturer on Midwifery and Diseases of Women, Edinburgh School of Medicine.

THE extreme rarity of an occurrence such as the title of this communication indicates appears to me a sufficient excuse to put it on record.

Mrs K., æt. 32, iii.-para, was sent into the Maternity Hospital on 17th July 1901. She had been in labour for twenty-four hours, and the membranes had ruptured twelve hours previously. As the delay in delivery had been recognised to be due to the presence of a soft swelling bulging through the posterior vaginal wall, an attempt at delivery by means of forceps had been made, with the result that a mass had protruded from the vulva, and was pushed back into the vagina. On examination after admission the mass was felt in the vagina, but labour-pains had entirely ceased. Dr Underhill was sent for, and kindly asked me to accompany him. On introducing the whole hand into the vagina the mass appeared to lie in the canal, and on being grasped to pull down for inspection it became detached and was removed. On casual examination it

presented the dark red appearance and softness of an œdematous polypus about the size of a small cocoanut. As the woman had already been so long in labour, forceps were immediately applied to the engaged fœtal head, and a living male child was easily delivered. The third stage presented nothing abnormal, but as free manipulations had been made it was decided to thoroughly wash out the genital tract. On introduction of the fingers to guide the nozzle of the syringe, they passed through a rent in the posterior vaginal wall, and suspicions were at once aroused that the tumour might have been extra-vaginal and burst its way through the tear. The tumour was now more carefully examined and incised, when it was found to be a dermoid cyst containing hair and much sebaceous material, indicating an ovarian origin. The rent in the vagina was now packed with a strip of iodoform gauze about 2 inches wide and 4 feet in length, and the vagina douched with antiseptic solution.

The progress of the patient was one of uninterrupted recovery. The after-treatment consisted in the daily dragging out of about a foot of gauze till it was entirely removed on the fourth day. Subsequent microscopic examination of the cyst corroborated the impression of its ovarian origin.

I have found four similar cases of expulsion *per vaginam* recorded; three of these, by Luschka, Lomer, and Berry, are tabulated by Playfair in a paper read before the London Obstetrical Society, while the fourth is recorded by Treub.[1]

In each of these, as in my case, forceps was used in the delivery. Four of the five mothers recovered, but with the exception of the case I have described, all the children were born dead. I have also found six cases recorded of expulsion of ovarian tumours *per anum* during labour; in four of these the result was fatal to the mother, in one the expulsion was completed by unaided uterine action.

Perhaps the main feature of practical importance in the consideration of these cases is the question of the management of labour if obstructed by similar impacted pelvic tumours. Fortunately this complication is rare, and may be said to occur once only in 4000 cases. But if labour be left to the

[1] *Bulletin Société d'Obstét. et Gyné. de Paris*, 21st April 1898.

spontaneous efforts of nature a maternal mortality of 50 per cent. has been shown, a result which makes it incumbent that prompt and energetic treatment should be adopted.

The recognised modes of management may be summarised as follows:—

1. Postural reposition of tumour into abdomen.
2. Artificial delivery *per vias naturales:*
   (*a*) Without diminishing size of tumour.
   (*b*) After diminishing size of tumour.
3. Cæsarean section and ovariotomy.
4. Vaginal ovariotomy.

In considering the relative value of these procedures, one must turn attention in the first place to statistical evidence. This has been most efficiently collected by M'Kerron in his exhaustive and classic monograph, entitled "The Obstruction of Labour by Ovarian Labour in the Pelvis,"[1] from which I quote. It may be summed up as follows:—

	Cases.	Deaths.	Per cent.
Reposition	41	5 =	12
Artificial delivery . . .	49	24 =	49
Disintegration of tumour .	33	4 =	12
Cæsarean section . . .	10	8 =	80
Vaginal ovariotomy . .	3	0 =	0

From a general review of these figures one fact stands out pre-eminently, and may at once be accepted—viz., that forcible delivery by dragging the child past the obstruction is a mode of procedure of such danger to the mother that it should never be attempted, and may at once be eliminated from the legitimate methods of treatment.

Comparison of the remaining methods reviewed is exposed to many fallacies, and must be considered with deliberation. In this way Cæsarean section, as employed in the cases recorded, has accorded to it a mortality which, with the more enlightened methods of operating of the present day, cannot be accepted as a true interpretation of its value. In like manner with our improved antiseptic methods, it is questionable if the death-rate after disintegration of the tumour would not be further

[1] *Obstet. Trans.*, London, 1897.

reduced, while the number of cases of vaginal ovariotomy is so small that a true estimate of its value cannot be formed. Reposition of the tumour, on the other hand, involving as it does slighter risks, may be looked upon as offering the principal mode of treatment adopted before operative measures were so readily undertaken as they are now, and may be taken as giving a fair average result of this method of management.

It will thus be seen that the results obtained by reposition and simple disintegration offer almost equal success—viz., a maternal mortality of about 12 per cent., a death-rate surely far beyond what may be reasonably expected from the operative methods now at our disposal.

The cause of death in both of these methods of treatment in the majority of cases is shown to be peritonitis, set up by injury to the tumour by pressure, twisting, and tearing. It would thus appear that the early removal of the tumour should be the treatment aimed at. This result may best be attained (1) by vaginal ovariotomy before delivery; (2) by ovariotomy as soon as possible after delivery, either after reposition or disintegration of the growth before expulsion of the child.

Vaginal ovariotomy has, as has been stated, been performed three times without a fatality by Rubeska, Stande, and Rapin. This result, which if taken in conjunction with the extraordinary successful termination of those spontaneously expelled, certainly strongly supports such a mode of procedure. Further, should an attempt at extirpation during labour be unsuccessfully attempted, the condition of the patient is no worse than if mere disintegration had been employed, as the tumour may subsequently be removed *per vaginam* or abdominally.

To my mind vaginal ovariotomy is a safe, and at the same time a ready, method of treatment. In these cases the tumour, to be intra-pelvic, must be small, and, being pushed down in front of the advancing child, can be comparatively easily reached, while the incision through the vaginal wall is the same as that required for simple disintegration. From every point of view it commends itself as the operation to be employed by the isolated general practitioner, as its efficient performance requires a very small armamentarium as compared with that necessary for laparotomy. After ligature of

the pedicle and removal of the tumour, I would prefer to stitch up the vaginal wound before attempts at delivery be commenced, so as to avoid further tearing of the vaginal wound during the passage of the child; but should uterine contractions expel the child before suturing can be done, packing and draining with sterilised gauze alone may be adopted, as in the case mentioned.

Abdominal ovariotomy within twenty-four hours of delivery has been performed on several occasions with unfailing success, and there seems no reason to suppose that it should be more dangerous during the puerperium than usual. It may be looked upon, therefore, as offering a mode of treatment with a mortality of less than 5 per cent., which is less than half that attained by disintegration alone, or even reposition. It has the disadvantage of requiring elaborate preparations for its efficient performance, which frequently cannot be attained, and, further, that it has to be performed in many cases in, one might say, "cold blood"—*i.e.*, after the delivery has been accomplished and the patient is probably comfortable, though perhaps slightly exhausted. Yet, when we consider the high mortality of 12 per cent. after simple reposition, it appears to me a justifiable undertaking after reposition whenever surrounding circumstances admit of its being properly performed, as it is only anticipating the necessary operation by a few weeks, and removes the immediate risks of a possibly injured tumour. Further, the patient by this means is saved a double period of being laid aside, the necessary period of confinement during the puerperium being occupied by the convalescence after laparatomy. After free disintegration of the tumour during labour, if unable to remove it *per vaginam*, laparotomy should in all cases be performed as soon as conveniently possible.

To sum up shortly, then, what might be proposed as the method of treatment in cases of labour obstructed by intra-pelvic ovarian tumour, I would suggest that on recognition of the condition the alternative methods of simple reposition, vaginal ovariotomy, and reposition with subsequent early ovariatomy, should be carefully weighed, and one or other adopted according to the surrounding circumstances.

Where the conditions admit of vaginal ovariotomy being

satisfactorily attempted, I would be inclined to advise this method of procedure even in preference.

Should reposition have been successfully performed, subsequent removal of the tumour within twenty-four hours seems to me quite a method of treatment to be recommended, if the surroundings admit of efficient operating.

In a certain proportion of cases operative procedures are contra-indicated on account of difficulties more particularly associated with the environments than anything else. In these, simple reposition and trusting to luck is the only mode of procedure, but to my mind this is not to be followed so rigidly as has hitherto been recommended. Doubtless, the recommendation of the removal of the growth during or shortly after labour appears at first sight somewhat heroic advice, but it is, I consider, justified by the high mortality which obtains under the present modes of treatment by simple reposition and disintegration of the tumour, and which it is desirable should, if possible, be reduced. At the same time, the management of this dangerous complication is to my mind worthy of more consideration; as, so far as I can learn, it has hitherto been but lightly dwelt on.

I have purposely refrained from entering into statistical details and discussing the ordinary methods of treatment, as these have been fully described in Dr M'Kerron's comprehensive monograph. I have confined myself entirely to the question of operative procedure, which, from our improved knowledge of technique and asepsis, has been largely shorn of its terrors, and offers, I venture to think, the only method by which we can reduce the mortality from this complication of labour, which must be considered at present undoubtedly excessive.

The President said they were indebted to Dr Haultain for a very interesting paper, and for the clear manner in which he placed the issues before them. He asked Dr Haultain whether, if the puerperium were perfectly normal, it would nevertheless in his estimation be the right procedure to remove the tumour immediately.

Professor Simpson said he thought Dr Haultain would find

that Dr Berry had communicated a record of his case to the Society in the sixties. It was, as Dr Haultain had told them, an extremely rare complication of labour. Dr Haultain had not dealt with ovarian complications of labour generally, but with those cases in which the ovary was in the pelvis, and in which they almost certainly had to do with dermoid cysts, as in the present case. It was interesting to find that the tumour could be expelled detached, with no hæmorrhage resulting from laceration of the vessels of the pedicle. He was strongly of opinion that Dr Haultain was quite right in suggesting that in many of these cases, instead of pulling the child through, it was better to incise the vagina and make the tumour collapse. At the same time he thought the first consideration was the possible reposition of the tumour. Long ago he had seen a case where it had been pushed up and no further trouble resulted, and in the Maternity, a short time ago, a similar tumour was quite easily pushed up, and the patient recovered. With regard to Dr Haultain's suggestion, that during the puerperium the abdomen should be opened and the tumour removed, though that might hold good for some cases where the tumour had undergone severe, protracted compression, and serious symptoms were supervening, he did not think there was need for the operation in cases which had been seen in time and the tumour pushed up into the abdomen. During the puerperium the patient was not in the best condition for ovariotomy, and they were warranted in letting the patient recover, only removing the tumour when the necessity arose, but certainly keeping the patient under observation. There is a condition in connection with these tumours of which Dr Haultain had not taken account —that in which the tumour was adherent in the pelvis. In one such case he himself had induced premature labour and obtained a living child, and he thought he had recorded the case in the *Transactions*. Dr Haultain had not alluded to this treatment. Possibly, also, in some cases it would be good treatment to cause collapse of the tumour and subsequently to turn. These dermoid tumours under any circumstances, when tapped, were much more apt to give rise to inflammation. He had had one case from the north of England under his care for a good while, where there was supposed to be suppuration going on in

the pelvis, but from the history of the case he was sure it was one of dermoid cyst of the ovary obstructing labour, which the medical attendant had punctured through the rectum and a long-continued purulent drain had followed. He (Dr Simpson) had opened freely with a Torquelin cautery through the vagina into the cavity of the cyst, which greatly collapsed and finally disappeared. The patient afterwards had a family. He remembered another case where a dermoid tumour had been tapped through the vagina, with the result that inflammation had been set up, and the cyst became fixed and adherent. The patient had conceived, and Dr Simpson had induced premature labour, with the result of a living child being reared. They had, therefore, to keep these complications in view, as well as those cases in which the tumour should be incised and removed. The paper was an extremely interesting one. It was of importance that all such cases should be recorded.

Dr M'Kerron (*of Aberdeen*) said that, considering its very serious nature, the complication of labour with ovarian tumours had received scant attention in this country, though more attention had been paid to it in Germany. The principles that have guided our treatment have, until recently, been those formulated about thirty years ago by Playfair. The mortality then was about 38 per cent., but it would be surprising if no improvement could be shown nowadays in the management of this complication. As a matter of fact it would be found that the mortality now was about 12 per cent. The older obstetricians had unbounded faith in natural powers to overcome obstruction —even so formidable as an ovarian tumour in the pelvis, and the old rule in such a case was to give nature a full and fair trial, and that attitude led to the great mortality of those days. The wisest treatment, no matter how small the tumour, is to deal with it in some way. He was in tolerable agreement with the measures suggested by Dr Haultain, but did not put them in exactly the same order. There were only three legitimate methods of dealing with an ovary lying in the pelvis—1st, pushing the tumour up into the abdomen; 2nd, puncture or incision of the tumour to diminish the bulk; and, 3rd, the removal of the tumour by abdominal or vaginal ovariotomy during labour. He purposely omitted Cæsarean section, which

should scarcely ever be necessary. By far the best treatment was the removal by abdominal ovariotomy. There were a number of successful cases recorded of the vaginal operation, and notwithstanding that this case demonstrated its safety, he considered the abdominal route the best method. There were eight or nine such cases recorded. Sometimes difficulty was occasioned by the full-time uterus, but if the uterus were first withdrawn from the abdomen, the tumour could be more readily elevated. He thought it was comparatively seldom that these tumours were found to be adherent to any great extent. Though the above was the best method, if it could be accomplished, it must be admitted a large number of cases occur where difficulties of time or place do not admit of either vaginal or abdominal operation, and it is often more dangerous to delay treatment than to take some more simple method. Under such circumstances it was best to push the tumour up into the abdomen. It was a comparatively safe method, and could usually be easily accomplished under an anæsthetic. There was an interesting case recorded by Löhlein, where the tumour could not be reduced till an assistant pushed the uterus over to the opposite side, thus allowing more room for the tumour to pass the brim. It must not be forgotten that there are certain risks in pushing up the tumours, but it was hardly consistent to say, as Bland Sutton does, that it was contrary to all the canons of surgery. He quite agreed with Dr Haultain that there was no reason whatever why ovariotomy should not be performed in the puerperium, and it was not more hazardous then than at any other time. He had the records of an unpublished case occurring in a London hospital, where the tumour was pushed up, and before the woman left the delivery table ovariotomy was performed, and an excellent recovery ensued. With regard to the other method of incision or puncture of the tumour, there had been a considerable amount of criticism. There was a great risk of infection of the peritoneum or the tumour, but it was a useful method in some cases, and might be the best means at the disposal of the practitioner to complete labour. It should always be regarded as only a temporary measure, to be followed afterwards by ovariotomy. The cases should be very carefully watched

throughout the puerperium, when the tumour was not removed after labour.

Dr J. W. Ballantyne mentioned a case occurring in the Maternity about five weeks ago, to which Professor Simpson had alluded, where a tumour, rather larger than the one now shown, was found, lying posterior to the vagina, and in which some hard sharp points could be distinguished. The child was presenting at the brim by the breech, and labour had commenced some hours. As the case looked somewhat serious, he had sent for Dr Hart. They had tried to push the presenting part up, under an anæsthetic, without success. Dr Hart suggested the genu-pectoral position, and they then were able to push it up quite easily, and the rest of the labour was completed practically without any trouble. He had recorded a case in which a dermoid had been expelled *per vaginam* in front of the head of the child, and this was the case reported in the *Transactions* (vol. xvii.). He had called it a dermoid, but not an ovarian dermoid, because he was not quite sure that it had come from the ovary. It consisted of a little, round, bony box, with a transparent membrane covering it. It contained some small spicules of bone, and the usual porridgy matter of a dermoid.

Dr Haultain, in replying, said that in regard to the question of the President, he would recommend removal of the ovary in twenty-four hours, the reason being that after reposition of the tumour, the mortality was 12 per cent., and, furthermore, that ovariotomy during the puerperium was as safe as at any other time, and only associated with a risk of below 5 per cent. Under the circumstances, they would now be operating on a case that must be operated on later; the patient necessarily was to be in bed for fourteen days, and another week would be of no disadvantage. Taking everything, therefore, into consideration, the operation was justifiable at that time. With regard to vaginal ovariotomy, for a practitioner who was isolated this operation, in needful cases, was little more difficult than that of disintegrating the tumour, for with a slightly larger incision into the vagina there was very little difficulty in slipping the finger up and dragging the tumour downwards, and tying the pedicle. He was pleased to think that Dr M'Kerron,

who had made it one of the great features of his professional experience to look into this subject, had coincided with what he had said in regard to the question of ovariotomy.

MEETING IV.—FEBRUARY 8, 1902.

DR JAMES RITCHIE, *President, in the Chair.*

I. The following gentlemen were elected Ordinary Fellows of the Society:—J. L. Green, M.B., Ch.B., 18 Wilton Road, Edinburgh; W. Sloss, M.B., Ch.B., Royal Maternity Hospital, Edinburgh; C. J. Hill Aitken, M.D., 71 Gilmore Place, Edinburgh.

II. *Dr Berry Hart* showed—(*a*) A LARGE FIBROID removed by supra-vaginal hysterectomy, where there was some difficulty in diagnosis; (*b*) SPECIMEN OF TRANSVERSE RUPTURE OF THE FUNDUS UTERI in a full-time pregnancy.

III. *Dr Haultain* showed—(*a*) A LARGE FIBROID UTERUS with carcinoma of fundus, also a UTERUS with adeno-carcinoma of body. The former removed by the abdominal and the latter by the vaginal route. Microscopic slides were also shown, demonstrating the different pathological types of the two malignant growths. These were of interest in so far as they entirely coincided with the clinical history of the cases. In the former, which showed very active proliferation of gland epithelium, the adenomatous type was entirely lost, and the patient (age 54) had only shown symptoms of post-climacteric hæmorrhage for six months, yet the hypogastric glands were already infected. In the latter a distinct history of two years' hæmorrhage was present, yet no infiltration of surrounding structures was noticeable. The microscopic appearances showed proliferating glandular epithelium still retaining its glandular structure, thus showing a much less malignant condition. (*b*) TWO TUBAL GESTATION SACS, at the 3½ and 4th month respectively, removed from the same patient, one on 3rd December

1900, and the other on 1st September 1901. (*c*) A LARGE CALCIFIED UTERINE FIBROMYOMA, removed from a patient aged 68. (*d*) MICROSCOPIC SPECIMEN of primary tubercle of cervix, showing typical giant-cells and tubercle bacillus.

IV. *Dr J. W. Ballantyne* showed—(*a*) CEPHALOMETER for antenatal measurement; (*b*) FŒTUS, with exomphalos and adhesion of hand to chest wall.

V. *Dr Haig Ferguson* showed a MYOMATOUS UTERUS which he had removed by abdominal hysterectomy (Kelly's retroperitoneal method) that forenoon. The patient was a single woman, aged 41 (sent into Leith Hospital by Dr Beveridge); she suffered from menorrhagia and pressure symptoms, and the tumour was steadily increasing in size. All of which conditions rendered interference imperative. The upper part of the tumour reached considerably above the umbilicus on the left side, the lower part was impacted firmly in the pelvis, towards the right. The operation presented no great difficulties after the initial difficulty of getting the pelvic portion of the tumour out of the pelvis, where it was firmly wedged. The operation was practically a bloodless one, in spite of the large vessels that had to be dealt with. The patient was menstruating at the time of operation, and it is interesting to note the condition of the endometrium in the specimen. A large submucous fibroid is seen projecting into the cavity of the uterus, which is a sufficient explanation of the menorrhagia from which the patient suffered.

VI. SYMPHYSOTOMY[1] IN DOMESTIC AND HOSPITAL PRACTICE.

By R. C. BUIST, M.D., Obstetric Physician, Dundee Royal Infirmary.

MY experience of symphysotomy is recorded in the histories of four patients.

CASE I.—Mrs F., æt. 25, had had three previous pregnancies. The first two children died in labour. In the third pregnancy

[1] For orthography of this word, *vide Jour. of Obstet. and Gyn. Brit. Emp.*, vol. i., p. 58.

labour was induced at seven and a half months by the bougie method, but the child only survived sixteen hours. In February 1897, she was sent to me by Mr D. M. Greig. The last period had been in June 1896, and the fœtal measurement corresponded to the thirty-first week. Her height was 156 cm. (62½ inches). Pelvic measures: Interspinous, 21·3 cm.; intercristal, 25·2 cm.; intertrochanteric, 32 cm.; diagonal conjugate, 9 cm. (3·6 inches). Distance from os pubis to upper fœtal pole (20 cm.) corresponds to the thirty-first week. Selecting Frank's method for permanent enlargement of the pelvis, I, expecting that by the end of pregnancy consolidation of the enlarged pelvis would have been completed, did not wait for the onset of labour. This was, as it turned out, unfortunate. The operation, which consists in chiselling off an anterior layer of the pubic bones and symphysis, dividing the cartilage of the posterior layer thus left, and suturing the anterior lamella to the gaping bones behind, was performed on 28th February 1897, with the assistance of Mr D. M. Greig, and Drs Buchanan and Foggie. The only modification of Frank's technique was that I pinned the bones with silver-plated knitting-needles instead of drilling them and suturing with silk. After the operation the temperature remained normal, but the maintenance of the dorsal position induced a torpidity of the bowel that proved intractable. Vomiting set in on the second day, and the pulse rose on the third above 100. Tympanites developed, and medicines and enemata alike proving useless, it was temporarily relieved by puncture of the bowel on 5th March. Nutrient suppositories were given, but the patient was very ill, and labour set in prematurely on 7th March. The presentation was right occipito-posterior, and after about twelve hours, the os being dilated, Mr Greig gave ether, and I delivered with forceps. During labour the silvered needles dragged, and the pelvis gaped widely, and delivery was easy. The pegs were not reinserted. The child was 47 cm. long, and its cranial circumference 32 cm. It unfortunately died of bronchitis on 20th March. After delivery the vomiting soon stopped, flatus passed, and the bowels proved manageable; but on 9th March the temperature rose, and along with breaking down of the

previously healed incision there set in phlebitis of the varicose veins of the right thigh and leg. This gradually subsided, and the whole condition so much improved that on 2nd April she was able to be up in the chair, and on 28th April was walking about, though a little crippled from the remnants of the phlebitis. The pelvis was firmly healed; and on 17th April its measurements were: Interspinous, 23 cm.; intertrochanteric, 32 cm. The patient has since had a varicose ulcer, but is now well.

(2) On 17th August 1899, she was again delivered at term. During the pregnancy she had a good deal of pain in the lower part of the abdomen, but was more annoyed by a persistent cough, not apparently caused by any chest condition, though latterly there were a few rhonchi to be heard at the bases of the lungs. The abdomen was much larger than usual, and too tense to give definite results on palpation. Pains at rare intervals occurred during the week before delivery, and the os was found dilated two days before. Eventually labour set in distinctly, and, finding a breech presenting, I got Dr Buchanan to give chloroform, and extracted a male child. A second was then found presenting by the head. This I turned and delivered without difficulty. During delivery the patient was in the Walcher position. The puerperium was complicated by a slight recrudescence of phlebitis, which on the fifth day sent the temperature up to 100°·6 F. On the thirteenth day an attack of intestinal catarrh again caused a rise of temperature to 102° F.; but on the next day, though weak, she was doing some housework as well as nursing the babies. The children measured 52·5 cm. (21 inches), and 51·5 cm. in length, but owing to religious prejudices were not weighed till after baptism, and then, on the fifth day, they weighed 7 lbs. 10 ozs. and 7 lbs. 8 ozs. respectively. Each biparietal diameter measured 10 cm., and the occipito-frontal circumference 35·5 cm. The further condition of both mother and children is entirely satisfactory.

CASE II.—Mrs F., æt. 20, a rachitic woman 146 cm. (57 inches) high, engaged me for her first confinement, expected in March 1898. Her pelvic measurements were: Interspinous,

21·5 cm.; intercristal, 23 cm.; intertrochanteric, 29 cm.; external conjugate, 16 cm.; diagonal conjugate, 9·5 ($3\frac{4}{5}$ inches) cm. In spite of instructions, I was not called till she had been two full days in labour, and three hours after the rupture of the membranes. The child was presenting in the right occipito-anterior position, and the os about the size of a florin. The fœtal heart-sounds were vigorous and the pains regular. Four hours later, at 6 A.M. on 21st March, the os having opened to about the size of the palm of the hand, the pains being strong and recurring every two minutes, there had been no descent of the head, which was fixed at the brim, and the caput succedaneum had become much exaggerated, and the heart-sounds were becoming weak and less regular. By 7 A.M. I had secured the assistance of Dr Foggie and two district nurses, and under choloform performed symphysotomy by Ayres' subcutaneous method. In this method an incision, or rather puncture, is made under the clitoris, a director passed through this in front of the symphysis, a probe-point curved knife passed along the track so made; then with the point kept constantly against the left forefinger in the vagina the cartilage is cut through from above downwards, the urethra being held aside with a sound, against which the forefinger presses. My incision was a little to the left of the mid-line, and bled freely, but this was easily stopped by a plug of iodoform gauze. Forceps were applied, and the child easily delivered, the ends of the bones admitting three fingers during delivery. The uterus contracted well, and the placenta was easily delivered. The child was slightly asphyxiated, but recovered in a few minutes. The perineum, except at the fourchette, was intact, but the tissues around the urethra looked bruised. The urethra being held out of the way with a sound, the pelvis was bandaged, and a retention catheter introduced. The delivery and operation together took under an hour. The child weighed 8 lbs., and its head measurements were: bitemporal, 7 cm.; biparietal, 8 cm.; occipito-frontal, 11 cm.; circumference, 33 cm. The right temporal region was much depressed, and the caput succedaneum much larger than usual. The child, which was nursed by the mother from the first, has thriven well, and the head deformity is now quite

obliterated. The mother's convalescence was fairly satisfactory. The temperature was never very high, though it reached 100° F. several times up to the tenth day. The pulse was, however, for two weeks almost continuously over 100; after that it became slower. The uterus involuted a little more slowly than usual, but was never tender. The lochia disappeared normally. The plug was removed from the incision on the second day, but another had to be introduced for bleeding. It was left two days more. The catheter came out, and as she then passed water spontaneously, it was not again inserted. At the end of the first week the patient complained that she could not hold the water, but this condition subsided in the course of a few weeks, and after she was allowed up, four weeks after the operation, incontinence came only on exertion. The patient was allowed up on the twenty-ninth day, though the symphysis was still movable, and ten days later she walked alone. On 15th June, in less than three months, she was at work in the jute mill. The symphysis was still movable.

(2) The patient's second pregnancy ended on 6th July 1899. The change of her pelvic measurements in seen in this table:

	1898.	1899.
Interspinous. . .	21·5 cm.	22 cm.
Intercristal . . .	23 „	25 „
Intertrochanteric . .	29 „	32 „
Diagonal conjugate .	9·5 „ (3¾ in.)	9·5 „

During this pregnancy, except a little frequency of micturition, she had no trouble. On 30th June she had some pains, but they stopped, and labour did not set in till 5th July, when after eight o'clock in the evening they came steadily. At 1 A.M. I found the head not engaged, the child lying O.L.A., and the os dilated to fully the size of a crown piece. At 8 A.M. the os had dilated, but the head not engaged, and the condition was the same at 5 P.M. At 9 P.M., when I arrived with Drs

Foggie and Halley, the membranes had been ruptured about half an hour, but though now fixed no descent had occurred, and the patient's pulse had gone up to 120. She was put under chloroform and placed in the Walcher position, and while the forceps were being got ready I noticed that during the straining under chloroform the head was descending. With the assistance of a little suprapubic pressure expulsion was effected without further difficulty. The child's length was 48 cm., and the occipito-frontal circumference 32 cm. In this case the puerperium was uneventful, and a week after the delivery I found the patient in bed with her clothes on. The symphysis was a little more mobile after delivery, but did not dilate perceptibly during labour.

(3) In the spring of 1901 I discovered that the patient was again pregnant, and tried several times to induce her to go into hospital for delivery. Late on Sunday, 2nd June, I was summoned, to find that she was in labour, the waters having broken on Friday, 31st May. The os was dilated, the head, with a considerable caput succedaneum, lying in the third position (O.D.P.), firmly gripped in the brim. The fœtal heart was audible, but slightly irregular. Dr Haggart kindly came to my aid and put the patient under chloroform. I applied forceps, and, placing the patient in the Walcher position, got her mother to pull on the arms, but I failed to deliver. My somewhat old-fashioned pocket-case contains a multiform knife, one of the blades being probe-pointed. With this I then did symphysotomy, and, rotating the head with the forceps, delivered with ease. The child had, however, died. The division of the symphysis was no more difficult than usual. The bleeding from the incision was pretty free, and, having no gauze with me, I plugged it with wool. Next day she was well, but on the morning of the third day, when the Jubilee nurse and I went in together, we found that she had been left alone all night, and the bandages were soaked with urine up to the naval. I removed the wool plug, but, as it turned out afterwards, part of it remained, and a week later broke down the bridge of the tissue between the incision and the urethra, so that the outer half-inch of the urethra admitted the tip of the little finger, and she had some diurnal incon-

tinence. She was allowed out of bed on the twenty-first day, and in six weeks (15th July) she was doing all her house-work. She walks as well as ever, and if need be could work again in the mill. The incontinence of urine gave so little trouble that she did not come for treatment till 11th January 1902, when she was admitted to my ward. She was fully four months pregnant, and incontinence was now causing considerable discomfort. On 13th January, under cocaine anæsthesia, I trimmed off the mucous membrane from the upper edge of the urethra proper on each side, and sutured with a catgut and silkworm-gut hoop. She went home on 25th January quite well. The pubic ends were movable, both up and down and back and forward.

(4) On 2nd May I was called, in passing, to the patient at her house. She was having pains every ten minutes, and the membranes had ruptured. The child was lying to the left. She would not go to the hospital, and another confinement prevented my attending her at home. Dr J. K. Lennox, who attended her, reports that delivery was spontaneous, and occurred about fifteen hours after the waters broke. The child is very small.

CASE III.—Mrs S., æt. 24, iii.-para, last menstruated July 1900, was admitted to the Maternity Ward, Dundee Royal Infirmary, on 5th March 1901. She had had pain over the right lower ribs since stirrage, of which she could not give the date. In the first pregnancy labour was induced at seven months, and she was delivered with forceps under anæsthesia, the child being still-born. She lay for four months. The second labour came on spontaneously at seven months, and lasted eight hours. The child is alive, and she was able to get up in three weeks. Her nutrition was moderate, and she had some catarrhal cough and spit—and complained of pain over the right lower ribs, preventing sleep. Measurements taken on admission show: Interspinous, 23 cm.; intercristal, 27 cm.; intertrochanteric, 30 cm.; external conjugate, 16 cm.; diagonal, 8 cm. ($3\frac{1}{5}$ inches). Distance between poles, 22 cm., corresponding to eight and a half months. Her cough and the muscular pain were treated. On the evening of 16th March, the fœtal pole

distance being 24 cm., and the child lying to right, I put a plug of sterile gauze in the cervix, and a pad in the vagina. Labour set in six hours later. After five hours the os was the size of a crown-piece. A Champetier bag was inserted, but burst, and under chloroform, dilatation was carried on by hand. I applied axis-traction forceps, and put the patient in the Walcher position, but failed to get the head down. I therefore proceeded to perform subcutaneous symphysotomy. After this the head came down in the forceps without difficulty and without rotation. The pubic ends separated over 2 inches. The placenta came away readily, and the incision was packed with iodoform gauze and pelvis strapped. The discharge was pretty free, and she twice had a drachm of ext. ergot. liq. One probe-pointed knife broke during the operation. Next day she passed urine normally. For a week her pulse was over 90, and on three days her temperature reached 100° F. From the fourth day she was given Blaud capsules. On the eleventh day the temperature rose to 101°·6, owing, apparently, to constipation. From this time the temperature was normal, but the pulse usually over 80. On the fourteenth day the pubic ends could be moved very slightly past each other. Up to this time she had been kept on her back, but the knees were now merely tied, and she was permitted to turn. On the twenty-first day she was allowed to walk with support. She did this without pain, but with a somewhat waddling gait. At the end of another week she went home. During the puerperium the suprapubic measurement of the conjugate was found to be 6·5 cm. (2⅝ inches). The promontory was only 4 cm. above the level of the pubes.

Three weeks later I was called to see this patient, as she had pains, and thought something had gone wrong. I found that she had been working in the mill for two weeks, and had some rheumatic pain in each leg. A few days later she was out, and probably at work. Some weeks later I saw her at the laneside, exercising her maternal privileges on her firstborn. At present she is working in the mill.

CASE IV.—Mrs M., æt. 23, iv.-para, last menstruation 12th February 1901, was admitted to the Maternity Ward, Dundee

Royal Infirmary, 7th November 1901. The history of her previous labours is: (1) November 1898, child born at term, lived ten days; delivery was spontaneous, but the head was badly crushed and dinted. (2) November 1899, at term, child delivered by forceps; still living, but head severely dinted. (3) November 1900, labour induced at eight months; the child was delivered by forceps, and only lived three days. The head was deeply dinted. Measurements on admission showed: Interspinous, 22 cm.; intercristal, 26 cm.; intertrochanteric, 30·5 cm.; external conjugate, 16 cm.; diagonal, 8·5 cm. ($3\frac{3}{8}$ inches); and fœtal pole distance, 24 cm., corresponding to first week of tenth month. On the morning of 11th November I inserted a Champetier bag, which burst in filling. No pains followed, and in the afternoon I dilated the os by hand, performed symphysotomy subcutaneously, and delivered by forceps in the Walcher position. During delivery the pubic ends separated 2 inches, and the head rotated a little forwards. The incision bled very little, and was not plugged. The child, which was lying to the right, was rotated by external manipulation. It weighed 6 lbs. 14 ozs. Bitemporal diameter, 8·5 cm.; biparietal, 9·5 cm. Urine had to be drawn by catheter till the fifth day, and was at first very bloody. On two nights in the third week she passed urine in sleep. The puerperium was somewhat disturbed at first, apparently by infection of the lochia, culminating in a rigor with a temperature of 104° F. on the fourth day, and by a slight phlegmasia of the left calf, with a second rise of temperature on the eleventh day. The first condition was dealt with by raising the shoulders and by douching, and the second by painting with ichthyol glycerine, and covering with guttapercha tissue. Apart from the pain in the leg, the patient had no discomfort, and seemed to wonder what we took so much trouble about. On the twelfth day she was raised on a rest, on the eighteenth taken into a chair for half an hour, on the twenty-first allowed to walk, which she did very well, and on the thirtieth day she went to her home in Fife.

Comparison of the cases yields some points of interest.

The diagonal conjugates were respectively 9, 9·5, 8, 8·5 cm. (3½ to 5½ inches). In all five labours the child lay to the right, but one was replaced by preliminary manipulation, two were posterior occipital, and one of these rotated in the forceps. During the delivery the pubic gape was usually over 2 inches. In three of the women the product of eight previous labours was two children—one after a premature labour, one after a very stiff forceps labour, and with a permanently dinted head. Three subsequent labours in two women ended in (1) large twins delivered with no unusual difficulty; (2) a good-sized child born spontaneously; and (3) a second symphysotomy. This last was a disagreeable surprise and a disappointment to me. One patient passed urine normally all along, and one on the second day. One had a retention catheter for a day, and then slight incontinence, which recovered spontaneously in a few weeks, and since the second operation has been successfully operated on for slight diurnal incontinence owing to the accident of the wool plug breaking and ulcerating into the outer end of the urethra. The last case passed bloody urine, and needed the catheter for five days, and twice in the third week passed urine in sleep. Two had thrombosis in the right and left leg respectively, and one had slight rise of temperature, due, I think, to the intestine. The patient with severe thrombosis was able to be out of bed in the fifth week; in the second case I kept the patient in bed four weeks, and on the last three occasions the patient has been out of bed in three weeks. In none has the gait been impaired, and two worked in a jute mill within six weeks and three months of the operation. The operation has three times been done in domestic practice—once in the tidy, clean house of a vanman, and twice amidst the conditions common to the poorer Irish workers. In these the nursing has been done by the district nurse, with such assistance as the relatives could give. Twice the cases have been in hospital. Four children were born alive, and three of these were nursed at the breast. One died in labour as the result of the long delay before I was called.

The method of operation was, in the first case, that recommended by Frank for securing permanent enlargement of

the pelvis, and though my unfortunate choice of the time was not in its favour, it has given a distinct gain. In the others Ayres' subcutaneous method was followed, and this, from its simplicity and ease, seems the best. I like to keep the knife-point in contact with my finger in the vagina, and a probe-point seems to have advantages both for the finger and for the structures behind the pubic bone. The movements of the bones are easily controlled by an assistant at each thigh.

In after-treatment a strap of broad rubber plaster is applied in front reaching well over the trochanters, and an elastic web bandage is placed over this not too tightly, and with wool pads over the trochanters and pubic bones. The patient is put on a firm mattress, and sand-bags laid to the sides of the pelvis. The shoulders should not be kept too low, and after a week the patient's desire to turn a little may be indulged. Mobility of the symphysis seems to do no harm. For urination the patient is raised by grasping the iliac bones. If the strapping become irksome, it may be divided in a few days.

The amount of oozing from the incision at the operation is sometimes considerable, but I doubt whether it is really necessary or advisable to plug the wound. Probably mere compression till the pelvis is bandaged would control the bleeding.

It seems best at present to allow my records, imperfect as they are, to exhibit by themselves evidence on the merits and dangers of symphysotomy without collating the statistics of others or entering into a full discussion of the relative claims of other operations. My cases have mostly been from a class where the prospect of life for a premature child is not good. In none of them could I deliver with forceps, and craniotomy of a living child seems to me the negation of obstetrics, while the greater risk of Cæsarean section for the mother will always lead me to choose symphysotomy in any case where a gain of $\frac{1}{2}$ inch in the conjugate promises delivery. The lower limit borders the sphere of Cæsarean section. Failure of forceps rather than measurement determines the upper range.

The operation by Ayres' method has now a recognised place

in the text-books, though I regret that Ayres' paper, with its simple method, seems to have entirely escaped notice. If this paper should to any degree remedy this, I shall consider that it has well repaid me for the writing.

Since this paper was read the following case has occurred:—

CASE V.—Mrs W., æt. 24, was admitted to the Maternity Ward, Dundee Royal Infirmary, on 20th April 1902, having had pains in the back for half a day. She had one child five years before, a seven months' child, born without instrumental aid. On admission, the abdomen was very tense, and palpation difficult. The head was found ballotting above the pubes, and the trunk lay to the right. The pelvic diameters were: Interspinous, 20 cm.; intercristal, 25 cm.; intertrochanteric, 27 cm. The conjugate now measures 7·5 cm. (3 inches) suprapubically. The os admitted only the finger-tip. The pains ceased during the night, and did not come on again till 1 P.M. on 25th April. At 9 P.M. pains had been coming vigorously for some hours at intervals of about a minute. The cervix was dilated and soft, but the head was still ballotting above the brim. Under my direction the patient was put under chloroform, and the membranes ruptured, giving issue to a large amount of liquor amnii. I fixed the head against the brim of the pelvis, and Dr Crow applied forceps, but failed, as I also did, to get any descent. I then performed subcutaneous symphysotomy, re-applied forceps, and, putting the patient in the Walcher position, effected delivery. Considerable traction was required. The head engaged in the left occipito-posterior position, and rotated to the left forward during delivery. The pubic bones separated about $1\frac{3}{4}$ inches. The placenta was born three minutes after the child. It was found that the tissues between the pubic bone and the urethra had torn through. A soft catheter was introduced into the bladder, and the pelvis bandaged with strapping and elastic web-bandage. The knees were tied together. The child, a male, weighed 5 lbs. 2 ozs., and was 18 inches long. The head measurements were:—Circumference, 32 cm.; biparietal, 9 cm.; bitemporal, 8 cm.; occipito-frontal, 11·5 cm. The cartilage was not found

at the first stroke of the knife, which had to be shifted a little to the right. There was very little bleeding, and the wound was not plugged. During the night the catheter was released every two hours, and about 2 ozs. of urine came away each time. In the morning Dr Crow administered narcotile, and I passed a stout catgut suture through the tissues above the urethra.

On the 28th the catheter slipped out, and there was a little leakage of urine. The ward sister re-introduced the catheter without difficulty, and the bladder was found to contain 8 ozs. of urine. On 3rd May the catheter was taken out, and the patient urinated spontaneously. There was no leakage. On 1st May the elastic bandage was left off during the day. The convalescence was complicated by the accident of a burn on the sole of the left foot and by mastitis on the left side, but otherwise has proceeded satisfactorily. The lochia have been normal throughout. The child did not suck well during the first three days, and on 5th May developed a discharge in the left eye. This was found to be diplo-coccal.

Patients IV. and V., with their children, were shown at a British Medical Association branch meeting at Dundee, on 30th May 1902.

References.

AYRES—"The Pubic Symphysis in Parturition," *Amer. J. Obstet.*, 1897, vol. xxxvi., p. 1; also *New York Med. J.*, lxxv., p. 629, 12th April 1902.

POOTH (for FRANK)—"Die künstliche Erweiterung des engen Beckens," *Monatsch f. Geburtsh. u. Gyn.*, 1896, Bd. iii., s. 491.

BUIST—*Brit. Med. J.*, 1898, ii., 17th September; *Scottish Med. and Surg. J.*, December 1899.

The President said that one of the matters of importance was the location of the position of the symphysis. He would like to know which method Dr Buist adopted. Did Dr Buist adopt any method of ascertaining the amount of movement at

the sacro-iliac symchondroses before he operated? He thought that the subcutaneous method seemed almost a backward step, because the tendency nowadays was to prefer the open method in such affections as tenotomy, wry neck, etc.

Dr Jardine said he had had a little experience of the operation, though not of the subcutaneous method. He also admired Dr Buist's tenacity in doing these operations, and had been very struck with the ease and success with which he had performed them. He himself had done the open method twice. In the first case the true conjugate was $2\frac{3}{4}$ inches. He had great difficulty in getting through the symphysis with the ordinary open method. There was a considerable bend, and he had to work round it. The child was delivered with forceps. When it was brought through, the ends of the bones were 4 inches apart, and the bladder was projecting out. There was a considerable tearing near the urethra, and he could have passed his hand round the right side of the pelvis. He eventually got the bones together, put in deep, thick catgut sutures, and closed the wound. The patient did very well till the fifth day, when she sat up in bed, and her temperature rose. He had to remove the stitches and drain the parts. She, however, recovered. Her subsequent history was of importance. Some months ago she came into hospital again in labour. On examination he thought the child could come through with forceps without operation, and it did so, in the Walcher position, without much difficulty, the child weighing nearly 8 lbs. There was very slight movement in the symphysis; the bond of union was very firm. He had heard a snap while drawing the child through, and thought the whole thing had gone, but that was not the case; it had not given way. The last case was done two months ago, in a case with a slightly larger pelvis. The patient made a good recovery, but there was some trouble because of great œdema of the vulva. She left the hospital well, and able to walk. The after-treatment of these cases had been very difficult. He would rather treat half a dozen Cæsarean sections than one symphysotomy. He strapped the patients, but in a few days the patients complained of the strapping, and they had had the utmost difficulty with them. They did not know what might happen with regard

to tearing in the open method. A good deal of force must be used to deliver with forceps. The subcutaneous method might be better, and he would give it a trial when the opportunity presented itself. Symphysotomy was an operation that ought to be done in certain cases, where the pelvis was nearly large enough to pull the child through.

Dr Berry Hart said he had never done symphysotomy, and therefore did not in any way criticise. He certainly thought Dr Buist had impressed them with the value of the subcutaneous method. It looked a very feasible operation in suitable cases. He thanked Dr Buist most heartily for his paper, and admired his pluck and tenacity in these cases. He asked about the thrombosis case for further particulars. It seemed as if, as in cases described by Mahler, that the pulse had gone gradually up before the thrombosis occurred.

Dr Munro Kerr was much interested in Dr Buist's paper, especially in hearing that Ayres' method had proved so satisfactory. His only experience had been of two cases. *Case* 1.—Conjugata vera of 3 ins. There had been ten previous deliveries, one child living, all the others born with difficulty with forceps or after craniotomy. The open method was employed, and he had great difficulty in dividing the symphysis. During the extraction of child with forceps the bones gaped 1 in. The child was alive, and weighed 6 lbs. Patient made an excellent recovery, and some six weeks after was going about and doing her household work as usual. *Case* 2.—Conjugata vera of $2\frac{3}{4}$ ins. Patient was a primipara. He attempted Ayres' method, but could not get the symphysis divided. He then did the open method, and went through the joint without any difficulty. During contraction with forceps the bones gaped $2\frac{1}{2}$ ins. There was considerable tearing about the urethra. The child was alive, and weighed 7 lbs. The after-history was quite satisfactory, and there was no trouble; but the patient insisted on leaving the hospital a fortnight after the operation. Two or three weeks later he called at her home, and found that the bones were united quite firmly, and there was hardly any movement. Some weeks later a nurse called, and found the patient quite well, and going about doing her household duties. Symphysotomy, Dr Munro Kerr thought, must remain permanently

one of the operations of obstetrics. The results obtained in recent years had been so satisfactory, that Professor Sinclair was not justified in making the statement he did in regard to the operation in his paper on Cæsarean section. The field for the operation was not large, and he did not think that below 3 ins. to 2¾ ins. of a vera an attempt should be made to perform it. He would say that 2¾ ins. vera was the lowest limit with a simple flat rachitic pelvis, and 3 ins. when there was a general contraction as well. Before operating, a very careful estimate of the relative size of the fœtal head and maternal pelvis should be made, especially where the measurements of pelvis approached the lower limits for the operation. The great objection to the operation was the after-treatment. And that was one of the reasons why it had been given up by certain operators.

Dr Haig Ferguson congratulated Dr Buist on the result of his operations. He would like to ask him, in regard to the plugging, where in the subcutaneous method the gauze plug was put?

Dr Buist, in reply, thanked the President and Fellows for their reception of his paper. With regard to the circumstances under which the operation should be done, one had to do one's best for the patient under the existing circumstances of the case. He objected to perforating a living child. The choice made was not always that which he would have selected under more favourable circumstances. As to tearing, he had not found any serious risk of tearing. Sometimes the difficulty in separating the symphysis was due to the subpubic ligament not being fully divided. When one was through the bone, the knife had to be passed on down a little. As to difficulty in finding the symphysis he could not speak. Difficulty had occurred several times in the open method. The operator must be guided by the ridge found on the posterior surface of the symphysis, shifting the knife a little bit to one side if it impinged on bone. He did not know that the location could be made by any special geographical means. With regard to the limits of the operation, he agreed with Dr Kerr as to 2¾ ins. being the lower limit. With regard to the upper limit, he did not think any rule could be laid down. He should be disposed to say that if he failed with forceps, and the child was living, he would be tempted to

consider symphysotomy at a higher limit than that suggested by Dr Kerr. As to the gauze plug, the puncture stretched a good deal, and there was often bleeding, and the gauze was inserted as one would plug a sinus; but he himself doubted if it was necessary, and in future cases he expected to get all he wanted by temporary pressure and swabbing with supra-renal extract. With regard to the after-treatment, as to the irksomeness of the plaster, he had not found it so serious as to give rise to a great deal of trouble. After three or four days he divided the plaster, and kept on the elastic bandage only. He thought a good deal of the difficulty in treatment came from the fear the nurses had of handling the cases. He had not, so far, adopted any plan for testing the mobility of the sacro-iliac synchondrosis. With regard to preference for the open method, he did not very well know how to answer an argument of that kind. In the subcutaneous method the puncture closed in three or four days, and no extra bandages or dressings were needed.

VII. SOME REMARKS ON DIAGNOSTIC HELP IN GYNÆCOLOGY.

By Professor FEHLING, Strassburg, Honorary Fellow.

THE success generally attending our gynæcological operations has gradually led to the fact that many gynæcologists, especially our younger members, attach no very great value to a thorough diagnosis. For them the discovery of a tumour near the uterus, along with the complaints of the patient relating thereto and resulting from it, suffices to decide the laparotomy, expecting thereby to be able to make the diagnosis subsequently. This mode of procedure, indeed, frequently involves no injury in the case of tumours which have to be removed in any case. But cases do occur where, after the diagnosis is made, the conclusion is arrived at that the operation should rather not have been performed, and that it has actually been injurious to the patient.

Such a step does not suit the clinical professor, who, in the interests of instruction, should at all times avail himself of every diagnostic resource, in order to obtain before the operation the most reliable diagnosis. Moreover, it is of the greatest import-

ance that the operator previously obtains the clearest possible information from the case, so that he may be able to contribute more to the interest of his patient.

In course of time our aids in diagnosis have constantly been improving. The examination beginning at the abdominal integument may be made in Trendelenburg position, while that made from the vagina and from the rectum may be eventually supported by the help of narcosis. Moreover, the uterine sound is to be taken into account; the moving up and down of the uterus by the volsella; or we may empty the bladder and bowels, or fill them with air or water.

In spite of our resorting to every reasonable expedient possible, extraordinary cases do still occur when the diagnosis is not perfectly clear, and as an extreme measure we have recourse to diagnostic laparotomy or diagnostic puncture.

Without the protection of antiseptics, the *diagnostic laparotomy* involved as much risk as the full operation itself. It is only in conjunction with antiseptics that it has acquired universal adoption.

Probatory laparotomy (exploratory incision) can be made in many different ways. Many operators make a small incision, so as to introduce only two fingers for examination. In that case the eye sees practically nothing, and especially in difficult cases, where the origin and nature of a tumour is to be ascertained, or in the case of doubtful growths, the examination in the dark with two fingers does not throw much light on the subject. Consequently, in such cases, the practical value of a small incision is insignificant.

Where a practical result is to be derived from the probatory laparotomy, a sufficiently long incision of the abdomen has to be made, so that the groping hand, acting in conjunction with the controlling eye, may closely observe the existing conditions. On the other hand, it does not lie within the range of the probatory incision to loosen adhesions, to dislocate or remove the tumour, or finally to make a puncture in it, before one has finally decided, after testing the conditions of the case, that the operation can actually be performed. For the only purpose of the diagnosis, whether the tumour originates from the uterus, ovarium, or from the tube, or perhaps from both, the explorative

incision is generally not necessary. It is only allowed in the case of big tumours which from the nature of the case have to be operated upon, where, however, the size of the tumour or concomitant ascites rendered the diagnosis impossible.

The probatory laparotomy represents here an attempt at operation. Does inspection and palpation show the impossibility of an operation, the abdominal cavity has to be closed up without delay. When, however, a beginning has been made with loosening adhesions and moving towards the tumour, the operation has to be completed, for nothing exists more dangerous than a half-finished operation. Inquiries after the results of the abdominal exploratory incision show, judging from my experiences and some communications in literature, that the results are very poor.

Worst of all are the results of incomplete operations; many patients die after a simple probatory incision, where, on account of big malignant tumours of the ovary, the omentum, or bowels, the operation has been abandoned. In cases of ascites with carcinoma the increase of ascites takes place very swiftly, so that often the healing of the abdominal wound is delayed. Notwithstanding the most careful antiseptic and aseptic precautions, which in other operations were sufficient, I have seen peritonitis or sepsis following on such exploratory incision. Consequently, after these unfavourable experiences, I have been very careful in performing probatory laparotomy, and I am inclined to limit this proceeding to a few cases. In the case of evidently large tumours, which, considering their size, complications, or metastasis, are not to be operated on, the exploratory incision greatly tends to a fatal issue. In such cases, therefore, it is the duty of the competent physician from the very first to desist from the operation.

Still less frequently, we will find occasion to undertake an incision from the anterior or posterior pouch of Douglas for the mere sake of examination. Tumours which would constitute a reason for such a step are usually small, and by no means difficult to be diagnosed; and merely for the sake of determining whether the tumour in question should be removed through the vagina or the abdomen, the vaginal incision should not be entered upon. This question has to be determined beforehand.

At present the *probatory puncture* plays a far more important part than the incision. Formerly, it was the chief means not only for the diagnosis of ovarian tumours, but moreover an important therapeutic procedure, as, for instance, in conjunction with injection of iodine in the case of ovarian cysts. With the introduction of antiseptics the successful execution of the most difficult ovariotomies became common, and puncture lost its value for diagnosis and therapeutics. Though we cannot easily get rid of this method for ovarian cysts, it is wrong to throw away probatory puncture in general.

It was a mistake, especially of our best books of diagnosis in Germany, those of Winter and F. Veit, that they attach so little value to probatory puncture. The puncture from the abdomen, in the case of large tumours which have made their way up into the great pelvis, can be dispensed with with few exceptions. An abdominal puncture is accompanied by greater risk than the small advantage gained from it. But I cannot go so far as to say, with Thornton, that it is criminal to do so; still, I should advise that it be abandoned, and replaced by abdominal exploratory incisions, when a help for diagnosis seems to be necessary.

The probatory puncture from the vagina is quite a different matter, especially in the case of smaller tumours of the adnexa, or in the case of exudation and accumulation of liquid in the pouch of Douglas and the parametrium. In the first place, cases occur where uncertainty exists whether the fluctuation in question is a real one or a pseudo-fluctuation. By tapping the fluid it is possible in some cases to find the nature of the tumour, whether belonging to the ovary or to the tube. The most important result, however, of the probatory puncture is, that it ascertains whether serum, blood, or pus is present. This decision can be of great importance for the diagnosis, far greater is its importance for determining which mode of operation is to be selected, whether the vaginal or the abdominal way; further, it can be carried out without any risk.

I do not understand why Veit maintains that the vagina could not be obtained free from germs for puncture purposes, while for purposes of vaginal total extirpation, vaginal ovariotomy and myotomy, he himself claims the possibility of having

it relatively free from germs. Of course, it is a necessary stipulation that the tumour to be opened actually adjoins the vagina, that the necessary antisepsis of the place where the puncture is to take place and asepsis of the instruments be ensured, and that the patient keeps quiet for at least twenty-four hours afterwards.

The application of a suitable instrument is another point of great importance. As long as I applied the simple puncture needle of Landau, which, strange to say, Th. Landau has again recommended lately, my results were inconsiderable. It was only when, on principle, I selected a (proof-tight?) syringe with thick point—after the model of Pravaz, in cases containing, to all appearance, thin liquid; whereas, in all cases with a thicker covering and coagulated mucous matter, I applied Dieulafoy's apparatus with thick needle (point 10 cm. long, 1·5 – 2 mm. thick)—that I obtained absolutely satisfactory results. With the hollow-pointed instrument of Landau not seldom a negative result was obtained, where the operation subsequently yielded liquid or pus.

According to these principles I have undertaken, in the seven years of my clinical work in Halle, eighty-one such punctures, invariably with good success.

By these punctures, in five times the diagnosis was secured, fifty-six confirmed, ten changed, six remained doubtful, and four without result. Only in five cases was there some disturbance following the puncture, one of which, with suppuration of an intraligamentous tumour, was cured by incision and drainage.

After carrying out the puncture the result has to be made out immediately, microscopically, where serum, blood, or pus is found, concerning their quality, consistency, etc., which is to be followed by a microscopical examination with regard to white and red blood corpuscles, or to cellules of the texture. Very important is the bacteriological examination of the obtained purulent matter, for gonococci or pyogenic germs; in the latter case, the value lies in vaccinating on agar, bouillon, etc., and in determining whether the staphylococcus and streptococcus still possess vitality or not.

The time as well as the mode of operation is often selected after this result.

Amongst the eighty-one cases of probatory puncture, according to the results obtained above, followed immediately the probatory incision in the pouch of Douglas in thirty-five cases; especially in the case of abscesses, pelvi-peritoneal exudation, decomposed hæmatocele, but not in the cases of pyo-salpinx.

In former times there was a great value attached, for the purpose of diagnosis, to the *chemical investigation* of the liquor obtained by puncture. These times are past; we will not longer ask the test of metalbumen and paralbumen, or at the present time that of pseudo-mucius, in order to make the diagnosis of an ovarian cyst. Even less value, indeed, has the knowledge of the chemical action of the liquid in question for ascites, amniotic liquor, or that of exudation.

Nevertheless, I would not like to regard the chemical investigation as being under all circumstances of so little value as generally is believed. Pfancusteil has shown that the pseudo-mucin of the cysto-adenoma of the ovary is distinguished by the fact, that on being boiled with dilute acids it is converted into a reducing agent, a glycoproteid, which reduces copper oxide like sugar in Trommer's test.

I came across really difficult cases, where the differential diagnosis, whether it was a large ovarian tumour alone, or the same together with pregnancy, was only to be made by the application of puncture and the employment of the reactions suggested by Pfancusteil.

I give a few notes:—

(1) I. Gravida, twenty-one years of age; the beginning of the pregnancy, end of September; six weeks later the abdomen swells considerably, from the fourth month continuously, so that the patient could no longer work. Admission into the clinic in February. Strong femoral œdema, trace of albumen, the abdomen cask-shaped, circumference 130 cm.; no traces of a child, and no signs of fœtal pulsation. Portico hard, no alteration with change of position. Diagnosis: Hydramnios.

9. II. Dilatation of the cervix; the bag of water is opened; there escaped only half a litre amniotic liquor.

11. II. Puncture in the right hypogastrium; the tapping brings 12 litres of a yellowish, green, slimy fluid. The amniotic liquor contains 7 per cent. albumen, and so does

the puncture fluid. The latter, however, gives the glycoproteid reaction.

13. II. Birth of a fœtus on the fifth month.

19. II. Symptoms of beginning peritonitis, therefore ovariotomy with good result.

(2) I. Gravida, twenty-two years old. Last monthly time end of November; first movement of fœtus in May 1899. Admission, June 1899. Abdomen is said to be enlarged a year ago; it increased considerably in the last weeks; œdema, heavy breathing, abdomen enormously distended; in the left side, parts of a fœtus; fœtal pulsation on the right side; above the sternum a crescent-shaped tympanitic depression. Urine, 2 litres a day, free from albumen; the percussion of abdomen varies with change of position, like ascites, whilst the fœtus keeps its place. The uterus is not to be found, even by rubbing it.

The differential diagnosis fluctuates between hydramnios with twins, or ascites with pregnancy, or flabby ovarian tumour extending over a great part of the pregnant uterus. The latter was the most likely.

Tapping in the right hypogastrium gave about 100 cub. cm. of a mucoid liquid, which gives the glycoproteid reaction. Diagnosis: Pregnancy with ovarian tumour.

21. VI. Ovariotomy.

26. VI. Labour set in, short forceps. Recovery.

It becomes evident from these histories, of which a good deal more could be narrated, that occasionally cases occur where the chemical examination of the liquid gained by tapping may support or reject a doubtful diagnosis, according to the presence or absence of the glycoproteid reaction.

The results of my clinical experience has shown that the vaginal puncture in the case of small tumours, especially those of the adnexa, is a harmless procedure, and useful for purposes of diagnosis as well as for therapeutics. It certainly merits a more extensive application. The probatory incision, however, from the posterior walls of the vagina is to be adopted according to the result of the vaginal puncture; the probatory laparotomy should be avoided as far as possible.

I would be very glad if, in accordance with these remarks,

the members of this Society be induced to communicate their experience relative to this subject, or should apply this diagnostic aid in suitable cases.

Dr Haultain said that they ought to be flattered at having a communication from one of their Honorary Fellows. It was one of the first he had ever heard, and he thought they should pass a vote of thanks to Professor Fehling for having taken the trouble to bring before them such an interesting practical paper. With regard to the question of exploratory incision and puncture, his practice had been almost entirely confined to the abdominal route. He had a preference for this route in all operations in the pelvis. The incision might be a small one at first to admit two fingers, the incision being afterwards enlarged to any size necessary for treatment. If there were a movable limited defined tumour in the pelvis, the puncture of that from the vagina was unnecessary; it would be better to go in from the abdomen and remove if possible. If there were a tumour in the pelvis with no well defined limits, it would be well to make a puncture first from the vagina, followed by an incision, and performing a curative operation at the same time. A further point not touched upon, was the route to adopt in extra-uterine gestation. In a number of cases of so-called hæmatocele, one should open from the vagina, and shell out and pack. But he was not convinced that that was the best method of treatment. He had seen two or three cases where it might have been better to have done this, but he had always gone in from the abdomen, and had not yet had to open the vagina to evacuate the contents, but had always been able to remove in entirety from the abdomen. On two or three occasions he had found the peritoneal cavity full of blood, and yet there had been no evidence from physical signs. As to the cases stated, in the second case it seemed to him unnecessary to make an exploratory puncture. The case seemed clearly to be one for abdominal section. Professor Fehling has shown, however, that exploratory puncture may be desirable under certain conditions.

Dr Haig Ferguson said they ought, as a Society, to send a vote of thanks to Professor Fehling for his paper. With regard

to exploratory incision by the vagina, he was inclined to agree with what Dr Haultain had said. If there were suspicion of pus in the pelvis, the vaginal route might be favoured. It was sometimes difficult to say if a diffuse swelling in the pelvis was blood or pus. In such a case, before opening the abdomen, it might be well to open the posterior fornix and find whether it was pus or not. On the first occasion in which he had done this he had found a large quantity of pus, and some weeks afterwards had opened the abdomen to remove the tubes. In a second case, where the physical signs were the same, he had found blood clot on opening the posterior fornix, and discovered an extra-uterine sac. He then opened the abdomen, at once removed the ruptured sac on one side, and what appeared to be a second extra-uterine gestation on the other side. In such a case an exploratory incision through the vagina was advisable, and had the advantage of providing free drainage afterwards. Another indication (apart from drainage) for opening the vagina was in connection with certain cases of laparotomy, namely, where the whole brim of the pelvis was matted with dense adhesions with pus in the tubes, where it was impossible to get access to the tubes, and where one, therefore, failed to remove the pus; in such cases one would be justified in opening the posterior fornix, and with one hand in the abdomen, and the fingers of the other hand in the opening through the posterior fornix, the pus cavities could be thoroughly broken up and evacuated from below. The hand in the abdomen served to guide the movements of the fingers in the pelvis, and prevented the risk of opening into the general peritoneal cavity from below. Dr Ferguson had treated one case in this manner with striking success.

Dr R. C. Buist said his preference was for making preparations for the complete operation at the one time, when the patient was under chloroform. In cases of collection of fluid, one proceeded in the same way, making a puncture with a knife and pair of scissors, making the diagnosis and carrying out the treatment at the same time.

MEETING V.—MARCH 8, 1902.

DR JAMES RITCHIE, *President, in the Chair.*

I. The following gentlemen were elected Ordinary Fellows of the Society:—E. R. Sword, M.D., Brandford, Ontario; F. E. Thompson, M.D., 20 Park Avenue, Montreal; John M'Gibbon, M.B., L.R.C.P.E., 55 Queen Street; P. B. M'Nicol, M.D., Stirling; T. J. Thomson, M.D., 31 Morningside Road.

II. *Dr Simpson* (for *Professor Simpson*) showed a FIBROID UTERUS, which presented in the interior two ulcerated surfaces, evidently the source of the hæmorrhage.

III. *Dr Haultain* showed—(*a*) A FŒTUS ECTROMELUS, to the delivery of which he had been called on account of placenta prævia, with severe hæmorrhage. (*b*) A UTERINE FIBROID, which he had removed by abdominal hysterectomy on account of its size. It was interesting in so far as it showed a great attenuation of the uterine cavity (9 inches), which was unassociated with any signs of menorrhagia or untoward discharge. The age of the patient was 32, and she had noticed the swelling for only about nine months.

IV. *Dr Lackie* showed, for *Dr Berry Hart*—(*a*) A FLESHY TUBEROUS MOLE; (*b*) CANCER OF CERVIX; and (*c*) VERY VASCULAR HYPERTROPHY OF THE CERVIX.

V. *Dr Brewis* showed—(*a*) OVARY, TUBE, and SAC, from case of extra-uterine gestation, removed by vaginal section, in which the blood had been seen escaping from the fimbriated extremity of the tube into the sac. (*b*) OVARIAN CYST which had ruptured a month ago, and recently filled up again, and in which the former opening is closed by a very thin membrane. (*c*) A SPECIMEN OF VERY EXTENSIVE DISEASE OF THE APPENDAGES, in which, during the operation, the pyo-salpinx had ruptured, contaminating the field of operations, and the patient had recovered after a great fight, during which the inhalation of oxygen had

appeared to produce very great benefit. (*d*) FIBROSIS OF UTERUS, with small fibroid tumour pushing forward the endometrium. (*e*) LARGE KIDNEY (RIGHT) AND PART OF URETER, removed by extraperitoneal route. The kidney itself was movable, but the ureter was closely adherent through its whole extent, especially at the brim of the pelvis. He had cut through the ureter at the level of the pelvic brim after separating it, and removed the upper part with the kidney. After detaching the lower part of the ureter, he pulled it through an opening in the roof of the vagina, and clamped it close to the bladder. During the operation the peritoneum had been opened, and the ovary prolapsed, but was returned, and the opening sewn up. The patient recovered and was very well, and tubercle bacilli had disappeared from the urine. (*f*) TWO DERMOIDS, one removed during pregnancy without any interruption of that event.

VI. THE PROBLEM OF THE PREMATURE INFANT.

By J. W. BALLANTYNE, M.D., F.R.C.P.Edin., F.R.S.Edin., Lecturer on Midwifery and Gynæcology, Medical College for Women, Edinburgh.

THE premature infant is born with the skin and the skeleton and the organs of a seven months' fœtus. He is called upon to play the part of a newborn infant with the *personalia* of a fœtus. He is admirably fitted to continue living in the uterus, but is ill provided to meet the exigencies of an extra-uterine existence. He is suddenly forced into surroundings of a kind which impose upon him urgent calls to which he is little able to respond. His tissues have not had time to mature, and he is not ready for so complete a change in environment. He is like some dweller in the hot plains of India who has been transported in a moment of time on some "magic carpet of Tangu" to the chill summits of the "frosty Caucasus;" with no opportunity for acclimatisation such as a gradual transit affords: he is suddenly submitted to the severe strain which so marked a change in surroundings entails; it is possible that the marvellous adaptive mechanisms of the human body will overcome the difficulties of adjustment of capabilities to requirements, but there will be danger till this condition of

physiological equilibrium is reached. So the premature infant is quickly transferred from the warm fluid medium of the liquor amnii, with its practically constant temperature, to the variable circumstances of an extra-uterine life; he loses the preparatory transition-time of the third trimester of intra-uterine existence, and although he may react with extraordinary success to his new environment, yet in many instances he fails to do so, and pays the heavy penalty of premature death. In too many cases there is a defective adjustment of capabilities to requirements; this is almost inevitable, for the requirements are exacting and the capabilities inefficient; he may then escape death, only to carry a debility with him which projects a baneful influence far into his postnatal life. This is the danger he runs, this is the price he has to pay for his earlier advent into the life that is after birth. Essentially the error is one of the time relations; if he had been a little longer in the uterus he had been better able to withstand the trying changes of birth; but he is an untimely birth. The problem is one of adaptation, of utilisation of manifestly imperfect powers to obtain results which are not easily to be got. Life is full of such problems; the individual is often being brought into circumstances to which he finds it difficult and sometimes impossible to adapt himself; he is often called upon to discharge duties which he could have done better had he had a little longer for preparation. The strain and stress of life lie in these emergencies, and happily the requisite strength often emerges to overcome them; but the problem of the premature infant is peculiarly urgent, for he is so dependent upon conditions external to himself. Upon the obstetrician falls the responsibility of aiding the prematurely born child in his struggle with the exigencies of his new environment. The more thoroughly he understands the problem, the more effective will his management of it prove. Let me therefore endeavour to set forth in detail the conditions which I have briefly indicated above.

Variability of Viability.

The premature infant differs from the immature fœtus in the possession of viability, that is to say, he is capable of an

independent existence outside the mother's uterus, an existence, it must be added, which is not limited to a few hours, but is potentially possible for months and years. Not only must his heart beat, his limbs move, and his lungs respire, but his digestive organs must also be capable of a certain amount of functional activity, and his tissues be able to assimilate nourishment brought to them through the alimentary canal. So much is certain; but when attempt is made to fix the uterine age at which viability may be said to be acquired, difficulties are at once encountered. It is not easy, for instance, exactly to estimate the uterine age of any fœtus; consequently, when one speaks of a premature infant born at the seventh month of pregnancy, one can only mean that the maternal symptoms and the physical examination of the mother and the infant pointed to that as the most probable date. Neither fœtal size nor weight can be regarded as sure indications of fœtal age, and the knowledge we possess of the chronology of the developmental processes is not exact enough to permit the drawing of accurate conclusions from them. Another difficulty exists in the fact that the maternal health during pregnancy has an influence upon the viability of the infant; thus the seven months' fœtus of a healthy mother may be altogether viable, whereas the seven months' fœtus of a syphilitic mother may be absolutely non-viable. The age of attainment of viability will, therefore, vary with the state of health of the parents. Even if the exact uterine age of the premature infant could be determined with sufficient accuracy, there would still be the varying factor of the infant's vitality as influenced by the varying circumstances of intra-uterine health; the viability of the child depends, therefore, not only upon the number of months spent in the uterus, but also upon the character of the life of these months.

It may, however, be asked whether it is not possible to fix some date which will take into account these factors of variability, and give what may be regarded as a reasonable estimate of the uterine age when viability is attained. Let us, for instance, maintain that a fœtus born of healthy parents, showing no obvious morbid state—either of disease or of deformity—and having an estimated age of six and a half calendar months,

is viable. Such an assumption is perfectly reasonable, and will be accepted by every obstetrician; yet the statement cannot be regarded as final, for in ten years it may be possible to make a similar one with respect to the fœtus of six or even of five and a half months. Improvements in the management of premature infants, such as have been made possible by the introduction of the incubator and the exclusion of sepsis, have already, so to say, pushed the age of viability back; it is probable that a better understanding of the problem to be solved may lead to the devising of therapeutic, dietetic, and hygienic measures which will push it still further back. Be this as it may, it is a fact of prime importance to remember that the age of viability is not a fixed, but a variable date.

The variability of viability need not, however, be interposed here to delay the discussion of the problem of the premature infant, for in this contribution the type of prematurity which is considered is that of the infant expelled from the uterus at the seventh month of intra-uterine life. Every one will admit the viability of a seven months' fœtus. The difficulties such an infant encounters, and the dangers he runs, may be regarded as the average difficulties and dangers of prematurity; they will be fewer in the eight months' and greater in the six months' fœtus, for of course prematurity passes by degrees into maturity at the ninth month of intra-uterine life, and merges into immaturity at the fifth.

Anatomy of the Premature Infant.

The premature infant, as has been already stated, possesses the skin and the skeleton and the internal organs of a seven months' fœtus; but it is necessary to enter a little more into details, and to define the anatomical characters which are contained in this brief generalisation. The weight of the premature infant varies from 3 to 4½ lbs., and the length is about 16 ins. The skin has a delicate, almost transparent, appearance, but has lost the bright red colour of earlier fœtal life; there is little subcutaneous tissue, so that the face has still a somewhat senile look, and the outlines of the limbs and trunk are sharp and not rounded. The lanugo plentifully covers the extensor surfaces of the limbs as well as the face and back;

there is now some hair on the scalp. The nails are thin and do not project beyond the finger tips, but they are quite horizontal as regards the underlying skin. In the eyes traces of the membrana pupillaris may still be seen, and the cranial fontanelles and sutures are large and wide. In the male infant the testicles will probably be found in the scrotum; but in a certain proportion of cases one of them may still be in the inguinal canal, and may be capable of being pressed back into the abdominal cavity. In the female infant the imperfect state of development of the labia will give to the vulva a gaping appearance.

These peculiarities of the anatomy of the premature infant are evident on external examination, but there are others which are revealed only by dissection or section. In the skeleton, nearly all the ossific nuclei which are found in the full-time infant are present in the premature one, but they are smaller in size, both absolutely and relatively. The ossific nucleus in the lower epiphysis of the femur, that distinctive "blood-red spot in the midst of milk-white cartilage," is rarely to be seen, and there is none in the upper end of the tibia, in the cuboid, or in the hyoid bone. The brain shows very clearly its premature state, for its grey and white matter cannot yet be differentiated, its ventricles are relatively large, and its fissures and convolutions slightly marked. The island of Reil is still exposed to view, for the margins of the fissure of Sylvius have not approximated sufficiently to cover it in. The filum terminale of the spinal cord ends opposite the third lumbar vertebra instead of opposite the first or second, as in the full-time infant. The foramen ovale of the heart is widely open, and the ductus arteriosus quite patent. The kidneys are distinctly lobulated, and the suprarenals and thymus are relatively large. The lungs, even in the premature infant that has breathed, are partly atelectatic. The cæcum is seldom in its permanent position in the right iliac fossa. In other respects the anatomy of the premature infant resembles that of the mature fœtus.

Anatomically, then, the premature infant is a fœtus; yes, but a fœtus without one of his most important organs. When the umbilical cord is tied and divided at birth, the infant loses

touch with his placenta—with that so essential organ of fœtal life. With the rupture of the membranes he has already lost touch with the liquor amnii, that fluid environment of antenatal existence which we may call the fœtal hydrosphere in contrast with the atmosphere which surrounds the newborn infant. The premature infant, therefore, is a fœtus lacking the placenta, membranes, and liquor amnii, which together go to make up the fœtal annexa. From the anatomical standpoint this is simply a loss; but from the physiological, as we shall see immediately, it is more than a loss, it is a distinct danger to the premature infant. It may be added that immediately after birth he loses another fœtal covering, namely, the vernix caseosa, which is carefully and completely removed by the midwifery nurse.

Physiology of the Premature Infant.

While from the anatomical standpoint it may be said that the premature infant is a fœtus without the structures which constitute the fœtal annexa, the same generalisation cannot be applied to the physiology of the child that is untimely born. Physiologically, the premature infant is partly a fœtus and partly a newborn child. In him is seen fœtal physiology endeavouring to cope with neonatal surroundings, but in him also is seen neonatal physiology hampered in its action by persistent fœtal conditions. Some illustrations may be given in proof of this statement.

There is, for instance, the temperature of the premature infant. The fœtus *in utero* has a temperature which is slightly higher than that of the mother; it is from one-tenth to two-tenths of a degree (Centigrade) higher than that of the containing uterus; the temperature of the liquor amnii is intermediate. The slight excess of fœtal over maternal temperature is to be ascribed to the metabolism which is going on in the fœtus independent of that which takes place in the placenta. No doubt fœtal oxidation is feeble, possibly it is similar to that going on in hibernating animals; but it is certainly present. Immediately after birth the temperature of the infant falls, a result due in part to the action of the cold atmospheric air, and in part to the evaporation of the liquor

amnii from the skin; but in the case of the full-time infant the loss is soon in part compensated by the more active metabolic processes going on in the body of the child, which in their turn are stimulated by the establishment of pulmonary respiration. In a day or two the temperature which is to be the normal for the rest of life may be attained. In the premature infant, on the other hand, the immediate postnatal loss of heat is great, and the temperature falls to a very low level, and, further, it may remain there for a comparatively long time. These facts are no doubt due to several causes, but among them must certainly be reckoned the defective action of the imperfectly expanded lungs, the absence of the thick layer of subcutaneous tissue which is to be found in the full-time infant, and the feeble metabolism which is going on in the organs and tissues of the premature child. Perhaps, also, the removal of the vernix caseosa and the want of an active heat-regulating mechanism may be subsidiary causes of this neonatal hypothermy. The fœtus *in utero*, then, does not require to manufacture heat in order to maintain his body temperature; the newborn infant needs to do so, and generally succeeds well; but the prematurely-born infant is urgently called upon to do so, and has only the tissue metabolism of fœtal life slightly reinforced by that of an imperfectly-established pulmonary respiration to aid him in his difficult task. Is it a matter for wonder that he often fails? Neonatal physiology is sadly hampered by persistent fœtal conditions. The premature infant, however, can remain in life with a temperature lower than an adult can, and he can do so for a longer time. Here is the other side, the fœtal side, of his physiology coming into play, and endeavouring to cope with neonatal surroundings.

Many other instances of the special characters of the physiology of the premature infant might be given. There is the liver, which in the fœtus is busily engaged in forming blood, and does little in the elaboration of bile; it is suddenly called upon to form much bile, and to continue yet for some time its hæmatopoietic activities. There is the blood itself, which contains more nucleated xanthocytes (erythroblasts) than in the full-time fœtus, and very many more red corpuscles. It is not known exactly what special part these

elements play in the physiology of fœtal life, but the jaundice of the newborn infant, which has been ascribed to breaking down of the xanthocytes, is very common in the prematurely-born infant. There is the circulation of the blood: at once its most active area (the placental) is cut off from all connection with the heart, and that organ is called upon to send a specially large supply to the lungs. This it may or may not succeed in doing, but through the tendency of the foramen ovale and ductus arteriosus to remain patent longer than is normal in the full-time infant, the complete separation of the two currents of blood in the heart and throughout the body is not accomplished; the circulation, therefore, is partly of the fœtal and partly of the neonatal type, and it is, in consequence, unsatisfactory. With regard to digestion, it is known that pepsine is present in the stomach of the fœtus, for fibrine has been digested by a solution made from a scraping of the gastric mucous membrane of an infant that died in birth (craniotomy); the saliva, also, is active to some extent, and there is evidence that the pancreas secretes pancreatine and perhaps trypsine, although not the diastatic ferment; but all these digestive agents are present in small quantity, and although they are doubtless capable of answering the slight calls made upon them by the presence of liquor amnii in the alimentary tract in fœtal life, they fail often in the presence of the more exacting demands resulting from the ingestion of milk by the premature infant. The dry mouth and the weak digestion, and the frequency of gastro-intestinal disorders in the prematurely born are matters of everyday observation, and need not be enlarged on.

Those are some of the signs of the difficulties that arise when the newborn infant attempts, so to say, to play the part of the full-time child with the functional possibilities of the seven months' fœtus. These difficulties are, to a large extent, removed if the fœtus is permitted to remain for a month or two longer in the uterus. In a general sense, they may be said to be removed, because the fœtus matures during the closing period of intra-uterine existence, the unborn infant becomes gradually less dependent upon its placenta simply because its tissues gain a greater functional activity. This is true, and

yet it is not all the truth. The physiological experiences of the last three months of fœtal life are not simply a continuation of those of the earlier months, differing perhaps in degree but not in kind. Modern research upon the problems of fœtal physiology goes to show that in the last trimester there is a functional activity peculiar to the period, an activity which differs distinctly from that which has characterised the middle trimester. It is during this time that fibrous changes are occurring in the chorionic villi, changes which prepare the way for the replacement of the placental activity by that of the various intracorporeal organs of the fœtus. The placenta is becoming senile. Further, increased activity is manifest in the kidneys, as is shown by the presence in their tubules of uric acid infarcts, as they are called. But of more importance, probably, than these are the alterations in the transplacental interchanges. This subject, of course, is one of great complexity and difficulty, but new light has been thrown upon it by the chemical analyses of the fœtus at different ages, and of the placenta; these are still few in number, but the results are strikingly suggestive.

Functions of the Placenta.

In the first place, there is some proof that leucocytes pass from the placenta to the fœtus, for it has been found by Varaldo that the blood of the umbilical vein contains more white corpuscles than does that of the umbilical arteries. Apparently, the matrifugal stream carries more leucocytes to the fœtus than the matripetal brings back; some of them must be retained in the tissues of the unborn infant. Possibly the leucocytes carry with them special chemical substances. In the second place, the analyses that have been made of the mineral constituents of the fœtus at different ages by Hugounenq and others, show clearly that there is a great fixation of minerals in the last trimester of pregnancy. There is a very marked storing up of iron in this period with a corresponding diminution in the maternal reserve of that matel. Fœtal hypersiderosis is accompanied by maternal hyposiderosis. In the last trimester, also, there would appear to be a great transference of potash salts from mother to fœtus; in fact the

soda salts predominate until the last three months, when the potash salts begin to pass in greater amount. There is also a flush of lime through the placenta in the last weeks, but this is not accompanied by a corresponding increase in the phosphorus transmitted; apparently, therefore, the phosphoric acid which is to combine with the lime in the bones of the fœtus passes first, and as it were, waits for the lime in the fœtal tissues. All these observations support the belief that the placenta has great selective powers, and is not the simple transmitting organ that it has often been supposed to be; indeed all recent research has gone to enhance the physiological dignity of the placenta, and to elevate it to a high rank among the tissues of the body. It has the power of selecting as well as of transmitting materials to the fœtus; its epithelium may even, it is supposed, have a peptonising effect upon proteids passing through it; it would seem to have the faculty of retaining in its tissues certain microbes, toxins, and poisons, which if allowed to pass would harm the unborn infant, resembling in this property the liver in the adult; and it is possible that it has an internal secretion of some value to the maternal organism. The peculiarities of the transplacental interchanges of the last three months of intra-uterine life would seem to be specially associated with the formation of red blood corpuscles, of striped muscle and of bone.

Doubtless there are other physiological processes of a distinctive kind going on *in utero* during this interesting and important epoch of antenatal life; the defences against the assaults of pathogenic microbes are being prepared, the myelination of the nerve tracts in the brain and cord is going on, and the renal epithelium is being made ready for its excretory function; but much research is needed before anything like a complete knowledge of the physiology of fœtal existence, and especially of the last three months of it, is available. Enough, however, is known to prove that the premature infant who by reason of his prematurity loses the physiological experiences of the last two months of fœtal life suffers a great loss. The consequences of the loss are evident during, at, and immediately after birth. Birth is to the premature infant the more or less traumatic transition from an

intra-uterine to an extra-uterine existence. All transition times are danger times; but Nature always tries to make transitions easy and safe by carefully preparing for them. *Natura non facit saltus* (Nature makes no leaps) is the old proverb, and the truth of it is very evident in connection with the transition of birth. In the case of the premature infant, however, Nature is not allowed time enough to prepare for the sudden changes from a semi-parasitic life inside the uterus to a more or less independent one outside that organ. The absence of the preparatory two or three months, with their distinctive physiological events, introduces a large degree of extra danger into the occurrences of birth and of the neonatal period. The results of this will be stated in the next paragraph.

The Pathology of the Premature Infant.

In its pathology the premature infant stands midway between the fœtus and the newborn child. In some respects its morbid processes develop, as in the fœtus, and in other respects they follow the lines of neonatal pathology. One or two instances may be cited in illustration. A fœtus takes diseases, so to say, by the umbilicus; the germs of disease coming to him from his mother pass through the placenta and arrive in his tissues by the way of the umbilical vein and ductus venosus. A newborn infant, on the other hand, receives infection by the more usual avenues of entrance, namely, the gastro-intestinal tract, the lungs, and the skin; in his case the umbilical route is effectually closed in part by the ligature of the cord, but more especially by the obliterative changes which take place in the umbilical vessels. In the case of the premature infant the closure of the umbilical arteries and vein is apt to be incomplete, and septic and other pathogenic organisms find their way into the body on account of the persistent permeability of these vessels. The results of the infection are sometimes evident in the immediate neighbourhood of the umbilicus in the form of periumbilical inflammation of an erysipelatous type, but at other times the umbilical vessels may show no morbid changes save permeability, and the pathological consequences of the microbic invasion may

be found in the liver, the heart, or in some distant organ such as the brain. In this respect, therefore, the pathology of the premature infant resembles that of the fœtus.

Again, the premature infant is specially liable to attacks of thrush in the mouth, of diarrhœa, and of dyspepsia; these are generally due to infection through the gastro-intestinal canal, predisposed to by the defective secretions of the digestive organs; and in this respect his pathology resembles that of the newborn infant.

Again, the premature infant is like the fœtus in the small degree of resistance he offers to pathogenic organisms when they once gain access to his body (this has been demonstrated very clearly in fœtal tuberculosis); he is like the newborn infant, in that many of his morbid states can be traced to injurious pressure acting upon him during his passage through the birth canals.

The result of this combination of the pathology of the fœtus and the newborn infant, which is witnessed in the prematurely-born child, is greatly increased morbidity and mortality. I need not dwell upon this point; every obstetrician knows from sad experience that it is rare for a prematurely-born infant to escape illness, and that it is too common for death to occur before what ought to have been his birthday has been reached. Some have placed the morbidity of premature infants as not far from 100 per cent., and the mortality at 50 per cent.; there is only too much reason to believe that in some circumstances this is no exaggerated statement. The prognosis is better when the infant has a weight and a development not widely different from those of a full-time child, when he comes of healthy parents, and when his temperature is not much below that of a normal newborn infant; but, of course, this is saying little more than that his chances of living are greater when he shows fewer signs of prematurity. Too often the premature infant is the offspring of parents who are themselves seriously ill or gravely weakened by toxic agencies; the premature termination of pregnancy is itself one of the signs of these parental states; hence it comes that what may be called normal premature infants are rarely met with. Of course, if the best treatment can be obtained for such a child

his chances of survival are greatly increased, and it is gratifying among all this prognostic gloom to throw the beam of light which has come recently from two of the large obstetric clinics of Paris (the Maternité de la Charité and the Clinique Tarnier), where the mortality has been reduced to little over 6 per cent.

Enough has been said to prove that the problem that faces the premature infant on his advent into an extra-uterine existence is no easy one, and that the risks of failure are great. Let me now devote some sentences to the consideration of the management of the infant born prematurely, dealing rather with general principles than with details.

Management of the Premature Infant.

The management of the premature infant consists in an attempt to attain a perfect adjustment of vital capabilities which have been shown to be generally inefficient to meet requirements which every one must recognise to be peculiarly exacting. The three leading principles which ought to guide in the performance of this difficult task will be: First, to prolong the most useful and the best features of fœtal life after birth; secondly, to supply some of the features which cannot be prolonged; and, thirdly, to awaken and strengthen the dormant or inefficient functions peculiar to postnatal existence.

In the first place, then, we ought to try to prolong the fœtal phase of life after birth has occurred. We cannot, so to say, return the premature infant to its proper place of abode, the interior of the uterus; but we can with some success endeavour to create an environment for him which shall in some points at least resemble the intra-uterine nidus. This environment is found in the incubator or *couveuse*, or "brooder." A gradual improvement in the construction of the incubator has taken place during the past few years, and the approved model of the present day, such as is to be seen in the Parisian hospitals and such as was on view at the Buffalo Exposition, meets in a fairly satisfactory fashion many of the requirements of the case. A temperature which can be with care kept constantly a little above that which the infant's body should register can thus be obtained, and the little patient can be kept in the dark and shielded from injury. Theoretically the

perfect incubator should contain saline solution and not heated air, in order to imitate more closely the uterine interior in pregnancy, and the infant should be bathed in this fluid medium or hydrosphere and suspended in it save only the mouth and nose; but it is doubtful whether this could ever be carried out in actual practice, and one has to be satisfied with an atmosphere (saturated perhaps with moisture) instead of a hydrosphere. The *couveuse* is a satisfactory means of maintaining the temperature of the child, and it thus prevents one of the great dangers to be apprehended—namely, hypothermy.

Some of the features of fœtal life cannot, as has been already said, be imitated. Among these, the peculiarities which are due to the presence and activity of the placenta will at once come into the mind. Some of the placental functions are performed by the awakened organs of the premature infant; thus the lungs endeavour to carry on the work of respiration, but the results are often unsatisfactory, and the organs may require to be aided artificially in various ways, as will be referred to immediately. Other of the placental activities, however, cannot be vicariously carried out. For instance, the function of preventing the ingress of germs, pathogenic or non-pathogenic, to the fœtal body cannot be done efficiently. The best that can be accomplished is to render and to keep the *couveuse* as nearly aseptic as may be. Again, it is impossible to imitate the nutritive interchanges which go on between the fœtus and the mother by means of the placenta; but experience has shown that if the mother is able to nurse, and if the infant is capable of drawing milk from her breast, a great deal can be done to improve the premature child's chances of survival. In the case of the fœtus, nourishment passes to the internal organs directly through the blood of the umbilical vein, and reaches the liver at once; in the case of the premature infant that is unable to suck, it has been found to be of advantage to pass predigested food directly into the stomach by means of a tube, or to drop it into the mouth with a dropper. This procedure, which has been termed "gavage," imitates, although not perfectly, the intra-uterine method of feeding, and will often help to save life.

With regard to the composition of human milk as com-

pared with that of the nutritive fluid which passes through the placenta to the fœtus in the last weeks of pregnancy, it is necessary to pay some attention. Analyses of the ash of human milk show that it contains a relatively large quantity of potassium salts and of calcium. In respect of these two constituents, therefore, the mother's milk or that of a wet-nurse may be said admirably to make up for the loss which the infant has suffered through being deprived of the last two months of intra-uterine feeding. Human milk, however, is known to be markedly deficient in iron; in this respect it differs from the milk of animals, and offers an exception to Bunge's law—resemblance between the ashes of the fœtus and those of the milk of the mother animal. This exception has been physiologically explained by the flush of iron which takes place through the placenta in the last three months of fœtal life in the case of the human fœtus; it has been thought that enough iron is thus stored up in the fœtal tissues to counterbalance the deficiency in the mother's milk. This excess of iron is, of course, wanting in the case of the premature infant that has lost the placental interchanges of the last two months of pregnancy.

It, therefore, seemed to me to be necessary to add iron to the food of the prematurely-born child. Theoretically, it might be well if we could give the iron through the skin; but the pharmacologist whom I consulted on this point did not regard the plan as feasible. It then seemed to me that we might give it through the mouth in an easily-absorbed and unirritating form. I accordingly tried the effect of the liquor ferri peptonatus, first in the case of full-time infants at the Maternity Hospital, and lately upon a premature infant in private practice. I gave it in doses of ℥ℓv thrice daily in a few drops of water between nursings. In no case did the medicine apparently cause any gastric or other disturbance. Of course the experience is too limited to enable us to judge whether the iron will prove a help to enable the premature infant more successfully to cope with the requirements of its new environment; but, theoretically at least, the giving of it would seem to be justified, and, practically, it does not at any rate appear to do any harm.

If human milk is not available for the premature infant's feeding, then, as every medical man knows, the prognosis for the child becomes much graver. The food which is usually given is cow's milk, although asses' milk if obtainable would probably give better results. The amount given ought not to exceed four teaspoonfuls at a time, and the intervals between feedings ought not to be longer than one hour and a half. Sterilisation of the milk is a *sine quâ non*, for the tendency of microbic infection by the gastro-intestinal tract is very great. As to the exact modification of the milk opinions differ, but it would seem to be reasonable to limit the amount of sugar, for the powers of the premature infant to digest this substance are small. In these cases, also, the iron would seem to be indicated.

To keep the infant much in the dark is also good, for the light may prematurely stimulate to inco-ordinated action the muscles of the eyeball, and so lead to the production of strabismus.

In the third place, our treatment of the premature infant ought to aim at awakening or strengthening the dormant or inefficient functions of its organs. This applies specially to pulmonary respiration, and includes as a rule the resuscitation of the infant at birth, for such infants are generally born in an asphyxiated state. The Schultze swinging movements are not particularly suitable for the premature infant (they increase evaporation from the skin and chilling, and may be traumatic), and I recommend rather one of the other plans of exciting respiration, such as the alternate flexing and extending of the trunk of the child as it lies upon the palms of the obstetrician's hands. The infant ought to be wrapped up in cotton wool while this procedure is being carried out. The inhalation of oxygen has been recommended, upon the principle that as only a part of each lung is acting it will be advisable to supply to it a larger quantity of oxygen than is contained in ordinary air. The plan has not been specially successful, possibly because the tissues of the premature infant do not lack oxygen, but rather the power of combining with it.

Urgency of the Problem.

With all care, and with every precaution, the premature infant will often fail to survive birth. This is very specially

the case when the prematurity is due to some active or chronic malady of the mother, or to a disease or deformity of the infant himself. The ideal management of the premature infant is, of course, prevention; and, no doubt, much is possible in this direction. But even if we could banish syphilis and alcoholism and lead poisoning, and the many other causes of the premature ending of pregnancy, there would still remain the infants born as a result of the therapeutic induction of premature labour. If this obstetric operation, which has always been a favourite in British practice, is to hold its own against symphysiotomy and the Cæsarean section, it is essential that the infantile mortality and morbidity be greatly reduced. The problem of the premature infant is on this account a very real and a very pressing one. Further, the steady fall in the birth-rate in the British Isles as well as in some foreign countries and in our own colonies, has, so to say, caused an appreciation in the value, economic as well as sentimental, of the premature infant. When it is borne in mind that in England and Wales in 1871 the birth-rate was nearly 35 per 1000 (34·7 was the exact figure), that it had fallen to 29·3 in 1899, to 28·9 in 1900, and that it was as low as 28·5 in 1901, it is evident that there is a pressing need to conserve the lives of the infants that are actually born, even although they are prematurely born. It may not be possible exactly to define their value to the State and the community, but manifestly it is greater now than it was when the birth-rate was 35 per 1000. The problem of the premature infant is urgent.

The President expressed the interest with which he had listened to the paper. The subject was one that had an increasing amount of importance, because it applied not only to children born before term, for the age of the child is no absolute criterion of the strength, and many born at full time are premature children so far as strength is concerned. When they remembered that over the whole of France one-sixth of all children under one year of age died of congenital debility, they would appreciate how very important it was rightly to treat these children who are born feeble. Dr Ballantyne rightly attached the first importance to the main-

tenance of heat. His observations on the temperature of newly-born children were most interesting. After birth there was a fall of temperature, and a considerable time always elapsed before it rose to normal; the length of time depended largely on the weight of the child. A child of full weight returns to a normal temperature very soon, whereas a child of low body-weight takes a considerable time. A cheap incubator was therefore a desideratum. The next point of importance was that of feeding the child. He joined issue with Dr MacVie when the latter said that the best method of feeding would be every second. Before birth nutrition was continuous through the blood, after birth it was by means of the stomach. One of the speaker's difficulties in practice was to make mothers realise that the stomach, like every other part of the system, required alternate work and rest; that constant work soon produced a breakdown. For young, feeble children, probably every hour and a half was a suitable period for feeding. What was the best kind of food, would form a very interesting subject for discussion by the Society. He knew of Dr Milne Murray's experiences in this subject, but the speaker had not obtained the same results. Although he had sometimes tried the method proposed, the result in young and feeble children had been serious indigestion. The best substitute for mother's milk was asses' milk properly diluted. Cows' milk has in a large number of cases to be humanised. As to bread and milk, it depends greatly on where children are brought up. He had had one case in town, in a family in which the previous children, born in the country, had been brought up on bread and milk. The town-born child was given to the same nurse who had brought up the others, and although he had given careful instructions he found, two or three days after its birth, that it was being fed on bread and milk; severe indigestion resulted, and it continued to have weak digestion for years, caused, he believed, by this improper feeding. All the other babies had been fed in the same way in the country, and did well.

Dr Milne Murray said they were much indebted to Dr Ballantyne for bringing forward the subject in such an exceedingly suggestive way. He had wondered then, a few

times during the reading of the paper, what had been Dr Ballantyne's reason for writing it, but Dr Ballantyne had in the last few sentences explained that. Dr Murray felt from experience that the premature infant was an exceedingly uncertain quantity, and that after a great deal of trouble in bringing one into the world, one's plans were often upset, and all the trouble wasted by the child succumbing. Dr Ballantyne had raised some very interesting points. First, with regard to the real value, economic and otherwise, they must keep in mind that while in certain premature infants the physical conditions might be unsatisfactory, yet the mental qualifications were provided for in a very high degree. Sir Isaac Newton, for example, was a premature infant; and then with regard to longevity, George III. was a conclusive case. Recently, as Dr Ballantyne had mentioned, the French School were inclined to look down upon premature children, declaring that they usually die, and that it was not worth while to keep those alive that were born living, and preferred Cæsarean section or symphysiotomy. The American School also were drifting in the same direction; not caring for premature labour, they were delivering at term by some other methods. But until some better reason was given, they must always consider the feasibility of the induction of premature labour under certain conditions. With regard to some of the points in Dr Ballantyne's paper—(1) the latter mentioned that the temperature of the fœtus *in utero* was higher than that of the mother. Dr Murray would like to know how that was determined. It seemed physically a very difficult thing to do. (2) As to the function of the placenta, without any scientific evidence, he had long felt that the placenta played a much more important part than the text-books implied. There was one point that demonstrated the fact that the placenta was an important intermediary—the fact that the fœtus could somehow reduce the maternal oxy-hæmoglobin; and there was physiological evidence to show that it was not merely dissolved oxygen, but oxygen from the hæmoglobin, that passed from mother to fœtus. That meant that the fœtus could itself decompose the oxy-hæmoglobin of its mother, and exercise its own hæmoglobin. It was possible that the fœtus itself was

capable of doing this, but the chances were more likely that the explanation would be found in the mechanism of the placenta. Then, as to the way in which phosphorus passed to the fœtus, there must be some medium by which it was carried. It would be very interesting to find in what way it passed from the mother to the child. The question requires a considerable amount of investigation. Then, as to the practical points of the paper—how to deal with the premature infant—he should like to record his own experience. During the last ten years he had invariably brought up all infants (not nursed by the mother) not by feeding them with ordinary mixtures, but on absolutely pure milk. He should be afraid to mention the number of children he had fed on sterilised milk—cooked milk—that is, milk boiled for forty minutes. Shortly after commencing this form of treatment he had occasion to induce premature labour in a woman who was syphilitic. The child was certainly not seven to ten days off a seven months' infant; it weighed 3¼ lbs., and he scarcely expected it to live for more than a day or two. It was placed in charge of a nurse who had had some experience, and she fed it from a bottle with sterilised milk. The child was now six years old, and he questioned if there is any better six-year-old child anywhere. This shows that premature children have certain adaptabilities. Since then he had had several premature children born spontaneously, and had never hesitated to use this form of treatment, and he was sure that his results compared favourably with those of anyone else. They must, therefore, give the premature infant a certain credit for adapting itself to circumstances. Not very long ago he had been speaking to a doctor, and had been mentioning this line of treatment, and the doctor had told him of a case that had occurred in his practice of a premature child with which he had not known what to do; but it had been handed over to its aunt, and the latter had fed it upon bread and milk, and the child had got on very well. So they must not lay too much stress on a specialised form of treatment. At the same time, Dr Ballantyne had struck an important line of discussion, and one that they ought to keep before them if for no other reason than that all children should be carefully preserved, seeing that there is such a decline in the birth-rate.

Dr Keppie Paterson said that many premature children died from want of proper care, and he believed this was largely due to want of incubators. Incubators required the attention of a skilled nurse, and their use was impossible among the poorer classes. It had occurred to him, while Dr Ballantyne was reading his paper, that the latter might do something more still for premature children by starting some central institute for them, so that they might obtain proper care. There was something of the kind in Paris, for he had seen it at the time of the Exposition there, and it might be quite possible to get assistance from the public and open something similar here. Or, perhaps a side ward at the Maternity Hospital might be made available for the purpose. He hoped Dr Ballantyne would not allow the practical side of the paper to drop.

Dr Haultain said it seemed to him that it was not quite necessary to have such an elaborate incubator as that which Dr Paterson seemed to think necessary. He himself had two, which were simple boxes, which were made mainly for conserving the heat of the child by a series of hot bottles reintroduced at certain hours, keeping up the temperature to 98° F. or 99° F. The results of using these had been more satisfactory than rearing without keeping up the body heat. These boxes had cost about twenty-five shillings each. Of course an incubator costing twenty-four pounds would be more efficacious and efficient, but a great deal might be done in a more cheap and practical way.

Dr J. W. Ballantyne, in reply, said there were many points that he felt he must touch upon for a moment or two, because they had arisen in the course of a discussion which he thought had been a very interesting one. With regard to what Dr Milne Murray said, he quite agreed that premature infants every now and then did show extraordinary powers of surviving under most disadvantageous circumstances; but they also could say the same thing about some full-term children. The heavy mortality, however, of premature infants showed that though some could survive anything, many could not, and it was with regard to the average premature infant that he specially spoke. There was one other point arising out of the subject with which he had not dealt, viz., the *after history* of

premature infants. He was exceedingly interested in the subject, and anxious to get details of the after history of premature children. A thesis had been published by C. Hahn, who had tried to investigate this subject. The premature infant was apt to suffer from strabismus and weakness of the torsal arch, when it grew up, and doubtless there were other morbid states to which it was predisposed by its prematurity. With regard to the determination of the temperature of the fœtus, this had been done by the passage of a thermometer into the rectum in breech cases, or into the mouth in face cases, and in one or two cases into the interior of the cranium in cases of craniotomy. Although the observations were few, yet there was always found to be a slight difference (from $\frac{1}{10}°$-$\frac{2}{10}°$) in favour of the fœtus compared with the uterine cavity. As to the value of the placenta, the exchange of oxy-hæmoglobin was an exceedingly interesting chemical point. There was a good deal of work being done on the subject just now, but as yet nothing definite had been found out. With regard to the transference of the phosphorus to the fœtus, the explanation that had been given was that it passed in the form of nuclein, or as some other organic compound. With regard to feeding on Dr Milne Murray's plan, might it not be that in giving milk undiluted, more iron was in that way obtained by the child? There would also be not so much sugar, and sugar was a thing not so easily digested by premature infants. With regard to incubators, he had seen it stated that at the Buffalo Exposition sixty-six premature children were treated there, with only a mortality of two. He did believe that something of the kind for the poorer classes, if set up in Edinburgh and other large towns, would be very valuable. With regard to different incubators, the disadvantage of the wooden box was its tendency to become septic. The metal incubator, with a constant stream of hot air passing through, was better. With regard to the question of having the child kept in the dark, he had not laid stress upon it in his paper, for he could not quite see the reason for it; but it might be that it was one of the means of preventing strabismus. With regard to Dr MacVie's remark about constant feeding, he did not admit that the flow of material through the

placenta was constant. Might there not be a call from the fœtus at special feeding times? With regard to Dr Milne Murray's plan of feeding with sterilised, unaltered cows' milk, he had not had any personal experience of it, but he was now much more careful about sterilisation of the milk than about the actual chemical constitution of it, for, when we began to alter one constituent of milk, we unavoidably disturbed the relations of the other constituents.

VII. FURTHER NOTES ON THE USE OF THYROID EXTRACT IN PUERPERAL ECLAMPSIA AND THE PRE-ECLAMPTIC STATE.

By H. OLIPHANT NICHOLSON, M.D., M.R.C.P.Ed., Obstetric Physician to the New Town Dispensary, Edinburgh.

IN a previous paper entitled "Eclampsia and the Thyroid Gland,"[1] I brought forward some evidence to show that it was possible to connect the occurrence of some cases of puerperal eclampsia with inadequacy of the maternal thyroid system—thyroid and parathyroid glands. I attempted to show how the principal symptoms of the eclamptic state could be explained in terms of thyroid inadequacy.

Special stress was laid on the fact that the arrest of the secretion of urine, by allowing the absorption of the toxins, led up to convulsions. I pointed out some of the ways in which the thyroid gland might, under normal conditions, participate in controlling efficient renal action, and thus indicated how a deficiency of iodothyrin towards the end of pregnancy might result in anuria.

In pregnancy the degree of the toxæmia comes to be dependent, directly and indirectly, upon the quantity and activity of the thyroid secretion; the thyroid gland must therefore be given a primary *rôle* in the causation of eclampsia.

On this view I recommended the use of thyroid extract in the pre-eclamptic state, and also after the onset of convul-

[1] *Trans. Edin. Obstet. Soc.*, vol xxvi., p. 184; *Scott. Med. and Surg. Journ.*, June 1901.

sions. In the latter case, however, it was pointed out that a large dose of morphia hypodermically was a valuable adjunct to thyroid treatment, because, by inhibiting metabolism, it stopped the formation of poisons, and gave the thyroid gland time to recover itself.

It was noticed also in these cases that large doses of morphia (grs. ½-1) produced profound effects on the circulation; the pre-existing condition of arterial spasm was fully removed. In this way the one essential and all-important indication for treatment—*re-establishment of the urinary secretion*—was fulfilled.

In my previous paper I was able to record one case of puerperal eclampsia treated by thyroid extract, which occurred in the practice of my friend Dr Elmslie Henderson, of Kirkcaldy. The results were eminently satisfactory. During the last few months opportunities have been afforded to me of testing more fully the efficacy of thyroid extract in combating the symptoms of eclampsia and the pre-eclamptic state. In view of the great importance of this subject, I propose in the present paper to briefly record some recent experiences without attempting much in the way of an explanation.

CASE I.—Mrs S., 25 years of age, consulted Dr Henderson of Kirkcaldy on the evening of Saturday, 14th December 1901, with a view to engaging him to attend her at her first confinement. She was then at the end of the eighth month of pregnancy. She complained of severe headache, continuous of late, but worst in the morning; of sleeplessness and nervousness. The daily quantity of urine had for some time been scanty.

She was uniformly swollen all over the body; the face was puffy and pasty; the skin was dry; the hands were swollen, and felt leathery from firm, tense œdema.

She was advised to go home to bed, and to take nothing but milk. It was arranged to visit her next day, and to have the urine examined; meanwhile a 5-grain thyroid tabloid was ordered to be taken every four hours. Early on Sunday morning (1.45 A.M.) Dr Henderson was urgently summoned to her, as she had taken a fit.

She had wakened complaining of severe headache, and was given some whisky and water. The headache increased in severity; she became comatose, her eyes became fixed, and finally she went into a fit. When seen, she was still deeply comatose; eyes staring, breathing stertorously, and highly fevered. She could not be roused. One third of a grain of the sulphate of morphia was injected hypodermically, and up to this point she had had no thyroid extract, as the tabloids had not yet arrived. The patient was watched for some time, and soon fell into a deep sleep. Dr Henderson then left, but only to be immediately recalled as another fit had occurred. The patient was in much the same condition as she was after her first seizure. After some time she awoke from her stupor, and 10 grains of thyroid extract were given by the mouth. Instructions were left with the nurse that she was to be given a 5-grain tabloid every four hours. The urine became solid on boiling. On Sunday she was carefully watched all day, and an increased quantity of urine was passed. A welcome perspiration was also noted. She was still very drowsy and stupid, and complained much of headache, and pain in the epigastrium. Restlessness was also a marked symptom, and she kept tossing about in the bed. She had a slight fit (the last) on Sunday night. The os uteri was undilated.

On the Monday morning marked improvement was evident; questions were answered rationally, and relatives were recognised. The urine was still increasing in quantity, and the skin was no longer dry. The temperature was normal, and the pulse was quite evidently softer. On the Monday night labour pains set in, and on the following afternoon (Tuesday), she was delivered of a premature dead-born child. In this case the brawny œdema of the arms, legs, and pudenda was very marked, and it rapidly subsided under the thyroid treatment. The urine quickly increased in quantity, and the albumen steadily disappeared. The patient made an uneventful recovery. The thyroid extract was continued for a week after the birth of the child.

CASE II. With regard to the case of eclampsia (Mrs L.), who was treated with thyroid extract, and reported in my

previous paper, I am now able to give some further interesting details.

The patient was attended in this confinement (the third), by Dr Henderson of Kirkcaldy. She developed eclampsia towards the end of the eighth month of pregnancy, but the labour, which took place at full time, was normal, and resulted in the birth of a living child. Her former pregnancies had been attended by severe and dangerous eclamptic seizures. After her recovery from her third confinement, in November 1900, Dr Henderson instructed her, in the event of her becoming again pregnant, to let him know as early as possible. It would then have been possible to give thyroid extract during the course of the pregnancy and watch the effects.

On 2nd February 1902, the patient called on Dr Henderson, and informed him that she was seven months pregnant. When asked why she had not come sooner, she confessed that she had, on her own initiative, been taking thyroid tabloids regularly since the third month of her pregnancy. So greatly was she impressed by the beneficial results of this treatment during her previous pregnancy—which ended in a labour entirely satisfactory—that she desired to test the effects of the remedy again.

She stated that she felt altogether different in this pregnancy. She had no sickness; no swelling of the face, arms, or body; no giddiness; no blindness, no headaches even. She said she had never felt better in her life.

On examination it was noted that she had no signs whatever of œdema, no diminution in the quantity of urine, and no albuminuria.

This patient is now in the eighth month of pregnancy, and when I saw her recently her appearance was very satisfactory. Usually a large, stout person, and especially so during her pregnancies, from superadded solid œdema, she was on this occasion precisely the reverse. Her face was suggestive of a person in the first weeks of pregnancy, when its thinness would attract attention; and the adipose tissue in the rest of the body was diminished. She is under close observation, and the dose of thyroid extract has been reduced to 5 grains daily in the meantime. The completion of her term is awaited with interest.

CASE III.—Mrs D., æt. 23, consulted Dr Hope Fowler on 4th January 1902, on account of severe headache and dimness of vision. She had just entered upon the seventh month of her first pregnancy. Her face, hands, and body were greatly swollen with the same kind of firm, solid œdema previously described as characteristic of some cases of eclampsia; her condition was indeed identical with that of a patient in an advanced stage of myxœdema.

The pulse-rate was found to be 50 per minute, the artery was greatly contracted, and it was with difficulty that the finger could obliterate the pulse wave. I have already directed attention to the possible significance of an *abnormally slow pulse* towards the end of pregnancy, especially if it persists, and Dr Fowler stated that, in this case, he made his diagnosis of albuminuria from the *rate* of the pulse.

In this case all the typical symptoms of the pre-eclamptic state—including great diminution in the quantity of urine—were present to a very marked degree, and the urine boiled nearly solid with albumen.

The patient was kept in bed, and was given nothing but milk for ten days. On 15th January Dr Fowler kindly asked me to see her, with a view to treating the condition with thyroid extract.

I found her still very much swollen all over the body; the face was puffy and bloated, and the forearms were so hard and brawny that it was difficult to pick up a fold of skin. The urine had only increased very slightly under the milk diet, and albumen was still present in large quantity (2 grs. to ʒ i.). The pulse was now 55 per minute; the artery was contracted, and the characters of the sphygmogram indicated a high pressure in the vessels.

Five grains of thyroid extract were ordered to be taken three times a day, and on the following day I obtained another pulse tracing, and also records of the radial calibre and blood-pressure. For nearly a month I took almost daily tracings of the pulse, and at intervals readings of the radial calibre and blood-pressure were also obtained. After 30 grains of the thyroid extract had been taken, the arterial calibre was obviously enlarging and the pulse-rate was considerably accelerated. The quantity of

urine was not yet noticeably increased, but the œdema was beginning to get softer.

On 21st January the tabloids were given every three hours, and a marked effect on the quantity of urine was noted. These increased doses caused much flushing of the skin and profuse perspiration, but the effect on the kidneys and on the œdema were not immediate. In two or three days, however, the quantity of urine was *enormously* increased, and the patient described herself as "melting away." On 29th January the face and arms were quite thin, and the œdema of the body had nearly disappeared. The patient remarked that she was now thinner than in her normal condition of health. The thyroid extract was given steadily for seventeen days; then stopped for a fortnight, and recommenced with a dose of 5 grains daily. During the treatment, fish, bread, and light puddings were allowed in addition to milk, and yet the albumen steadily decreased till it was entirely absent. On the 2nd of February the patient was allowed to get up, and returned to ordinary diet—a moderate amount of butcher meat being permitted. The pulse was about 90 per minute, and much softer. She was shortly able to resume her household duties, and the œdema showed no signs of returning. The urine was secreted in satisfactory quantity, and remained free of albumen.

She remained up and at her work till the morning of 10th March, when, after a normal labour, she was delivered of a premature dead-born infant.

With regard to the date of fœtal death, reference to Dr Ballantyne's recently published book would enable one to put it down at something *under forty days* before expulsion. Dr Ballantyne, who kindly examined the fœtus, was of opinion that the child had been dead from three to five weeks.

CASE IV.—Mrs P., æt. 39., ii.-para, was seen on 27th February 1902. She complained of severe headache, giddiness, and of attacks of vomiting. For several weeks she had noticed that the daily quantity of urine was less than usual, and also that her legs were getting swollen. There was no definite œdema of the face or hands. The urine was examined, and on boiling threw out a thick precipitate of albumen.

Next day a 5-grain thyroid tabloid was given every four hours during the day, and she was advised to remain as much as possible in bed. Milk, fish, bread, and light articles of diet were allowed.

On 3rd March, after 50 grains of thyroid extract had been taken, symptoms of "thyroidism" were apparent. The pulse-rate was accelerated; the radial calibre was enlarged; there was marked flushing of the skin, with perspiration, and slightly increased secretion of urine. The albuminuria was also somewhat less; the headache had disappeared, and there had been no vomiting for two days.

On 5th March there was a striking increase in the quantity of urine—half as much again as the day before—and now no albumen was found on boiling the urine. The cold nitric acid test, however, showed a faint white ring at the junction of the urine and acid. Headache had not returned.

On 7th March urine was still being passed in satisfactory amount, and the patient noticed that she had become considerably thinner about the body and lower limbs. The cold nitric acid test still showed a faint trace of albumen.

On 11th March the patient felt well again, and was allowed to remain up for a longer period of the day. The increased quantity of urine was maintained, and the albumen had practically disappeared. Two thyroid tabloids are to be taken daily in the meantime. Fœtal movements were felt by palpation, and the fœtal heart was heard.

I have now shortly related the results obtained from the use of thyroid extract in one of the most serious and most dreaded complications of pregnancy. These results are too definite and too striking to be ascribed to mere coincidence. Anyone who has used thyroid extract, as I have done in a large variety of cases, and who has simply confined his observations to the effects of the drug on the circulation, cannot fail to be impressed by the widespread therapeutic possibilities of the remedy.

And I may here mention that it is an important matter to use a preparation of the thyroid gland which can be absolutely relied on. This is difficult, because the amount of iodothyrin in

different thyroid glands varies considerably: therefore one 5-grain tabloid may contain much more of the active substance than another. The activity of the tabloids is also apt to deteriorate after exposure to the air, and if kept too long in stock. I feel sure these facts help to explain the disappointing and contradictory results of thyroid treatment in the hands of different observers.

Thyroid extract is not a dangerous remedy if the patient be carefully watched, unless in exceptional cases, and then because a degenerated myocardium may find it difficult to respond to meet the needs of an accelerated beat. Patients react very differently to the drug, and those suffering from goitre, myxœdema, or any other condition of hypothyroidism, are peculiarly sensitive to its effects. It is suggestive that in eclamptic subjects symptoms of "thyroidism" are generally very easily induced.

Many of the symptoms which patients develop under thyroid treatment are probably due to the profound circulatory changes produced by the drug. The earliest and constant effect is a marked acceleration of the pulse-rate, and this is followed in a few days by increased warmth and flushing of the skin, due no doubt to the uniform enlargement of the calibre of the arteries. This is succeeded by perspiration, and still later by obvious diminution in the body-weight. This loss of flesh, or perhaps it may be removal of fluid from the body, is invariably noted, and there is ultimately increased diuresis. But in the eclampsia cases increased secretion of urine was *not an early effect* of this treatment—it was some days before the adequate function of the kidneys became restored.

In the use of this remedy in eclampsia and in the pre-eclamptic state, can the strikingly beneficial results obtained be brought about entirely by the changes produced on the circulation? Supposing we admit that the drug possesses a specific action in enlarging the calibre of the vessels—that is, in fully relieving a condition of arterial spasm—is this a sufficient explanation of the disappearance of symptoms of a very threatening character? The relaxation of the renal vessels under its use would account for the re-establishment of diuresis, for reasons which Sir Lauder Brunton's researches on the action

of digitalis have clearly proved, but I do not think that this alone is enough to account for the removal of other symptoms. In eclampsia, the action of the remedy would appear to be something of the nature of a specific, and, possibly by favouring metabolism in some unknown way, it is able to exert some control over the condition. It may also assist in the removal of urea and other urinary products which have accumulated in the tissues previous to the onset of convulsions. These substances will be excreted *early* in the urine by the increased activity of the kidneys.

But meanwhile, the only definite statement I am able to make is, that *by producing symptoms of "thyroidism" in an eclamptic patient, re-establishment of the renal secretion is secured,* and the albuminuria and other symptoms steadily disappear.

Among many other interesting things I would like to refer to, I mention one which may not be without some significance. It is the colour of the eyes in patients who become eclamptic. It may be that my own experiences are singular, but most if not all the cases I have seen had *dark* eyes; the pigmentation of the iris was of a light or deep brown colour. I have never seen an eclamptic patient with clear blue eyes. Another point is, that these patients certainly seem to be less liable to hæmorrhage after labour than those with light blue eyes, and this is a matter which has several suggestive aspects.

Note.—I am now able to record the subsequent history of Cases II. and IV.:—

CASE II.—This patient, Dr Henderson informed me, exhibited some signs of "thyroidism" during the seventh month of her pregnancy, and the thyroid extract was discontinued. About a month later, after getting a chill, she complained of headache, and a general feeling of *malaise.* There was then some œdema, less secretion of urine, and a considerable degree of albuminuria. She was ordered to go to bed, and was given 10 grains of thyroid extract daily. This treatment soon got the symptoms under control, and she was able to do her housework. At this time—7th March—when she was at the end of the eighth month of pregnancy, I saw her. On 13th March, after

a short normal labour, she was delivered of a dead premature child. There were no abnormal symptoms either during labour or the puerperium. The child had been dead for seven or ten days.

CASE IV.—On 15th March symptoms of "thyroidism" were present, and the tabloids were discontinued. Two days later, headache and vomiting returned; there was a diminished quantity of urine, and albumen was again readily detected on boiling. Thyroid treatment—10 grains daily—was immediately recommenced. Everything then progressed satisfactorily, and on 19th March, at 6.30 A.M., I safely delivered her of two fine infants—a girl and a boy. It was necessary to use the forceps for both children, owing to a slight degree of contraction at the brim; but apart from this, everything was quite normal. The mother made an uninterrupted recovery, and on 21st March the urine was free of albumen. Thyroid extract was not given in this case during the puerperium. Both children are at present strong and healthy.

It is noteworthy that none of the cases of eclampsia treated by thyroid extract developed *post-partum* fits.

Dr Haultain said they were extremely indebted to Dr Nicholson for having pursued his investigations into the subject. With regard to the actual results, there were one or two points that must be brought forward. It was a great pity that the child was born dead in the third case. If it had been born living, he would at once have said that Dr Nicholson had established a good point in favour of thyroid treatment. But they knew that after the death of the fœtus there was the tendency for the albuminuria to cease. It appeared to him that from the point of view of being a dilater of the blood-vessels, it would probably act efficiently in many instances in allowing the elimination of the poison through the skin, and eventually through the kidneys also. It was probable that in eclampsia the kidneys were only secondarily affected, and that the primary source was situated elsewhere, probably in the liver. It was well exemplified that there were cases where the albuminuria ceased when the fœtus died, in which also it was evident that there was less strain thrown on the liver, less tissue meta-

bolism, not so much poison, and in which, naturally, the case cured itself. He thought that everything pointed to the liver, probably, and perhaps some other organ also, being the original cause of the disease. If thyroid extract could be shown to act in this way in active metabolism, it would certainly be a valuable drug. At the present time nothing has been shown beyond the fact that it acts as a vaso-dilator, and therefore tending to obviate the spasms associated with eclampsia. He thought they had a drug, and a very valuable drug, in thyroid extract to assist them in warding off fits. He thought they ought to assist Dr Nicholson as well as they could by giving thyroid extract and relating their experiences. Since Dr Nicholson's first paper he had not had a case of albuminuria in pregnancy, but he had kept the matter in mind, and would use thyroid extract in a suitable case. They were greatly indebted to Dr Nicholson for his valuable and interesting paper.

Dr Milne Murray said he quite agreed with Dr Haultain in thanking Dr Nicholson, first of all for the record of his painstaking physiological study, especially in connection with the appearances produced in some cases of eclampsia. He wished to enter a protest against the assurance Dr Haultain seemed to have with regard to the liver as being the cause of eclampsia. At the present moment, as far as he could gather, there was no evidence to show that the liver was more involved than any other organ. He was happy, however, that they were now cut away from the renal hypothesis, which had obscured the subject for so long. Certain conditions associated with the prodromata of eclampsia can apparently be relieved by the action of thyroid extract. At the present moment he had under observation a patient whose case bore on this question. A lady (primipara) living in the country had come to him when three months pregnant to ask him to attend her, and he had not seen her again till three days before labour came on, when he saw her at her own home in bed in the twilight, and she appeared quite well, and said she had never felt better. He told her to send up a sample of urine for examination, but it was sent not labelled, and was not examined. On the afternoon of the next day he saw the patient again, having been sent for because the pains had commenced. He was at once struck by the fact that she

had some puffiness under her eyes, and on examining her hand, noticed that her ring seemed sunk in a little, and the patient herself volunteered the information that she had had some difficulty in shutting her hands. He made inquiry about the urine, and found that she had not passed as much as usual for some little time. He had another specimen sent to him, and found it almost solid with albumen, and went back very soon expecting to find all sorts of complications. On waiting in the drawing-room, he began to speak with the patient's sister, who was a nervous, agitated person, and in looking at her he noticed that she had a very large goitre. He asked about this, and found that she was the subject of exophthalmic goitre. He found the patient doing well, and on examination discovered that she also had a distinct goitre, and on feeling the pulse (which he did now for the first time—he had only seen her three times before) found it 48! The labour went on quite satisfactorily. There was a little delay at the perineum, and as the heart was becoming more feeble, he had put on forceps and delivered without any trouble. He examined the urine the next morning, and found it still almost solid with albumen. This had gradually disappeared, except for a very slight amount which was still present. In all other respects she was quite well, and had never had the least trace of headache, and never any visual disturbance. The pulse yesterday was 60, to-day it was 65. He had restricted her diet, giving her nothing but white food. There were a good many cases of albuminuria in which there was no tendency to eclampsia, and he had long held that many enter on eclampsia without any trace of albuminuria to the end, and this woman had this prodroma of eclampsia without any suggestion of a fit. As to the dangers of thyroid extract, there is in the Royal Infirmary at this moment a patient in whom the last confinement was very difficult, from a malacosteon pelvis. Dr Hart had put her on thyroid extract for some time. Last week it was resolved to remove the ovaries as the most likely way of stopping the disease, and Dr Hart had arranged to do this, but was unable to come up that day, and asked Dr Murray to operate for him. The patient was brought into the room, and we found her pulse-rate was 135, and at first he had

hesitated as to whether to operate, but he considered it better to do so, and removed the ovaries. The operation was a very easy one, and the patient was only nineteen minutes out of her bed. She left the table with a pulse of 135; an hour afterwards it was 180, almost unaccountable. For three days it never fell below 170. Yesterday it began to fall, and to-day it is 136. There were never any other signs; but she was extremely asthenic, and looked as if she were going to die. The only remedies used were ether injections and strychnine, and for a short time digitalis; but the latter seemed to produce some cyanosis, and was stopped. She was fed by the bowel till yesterday. Undoubtedly, long dosing with thyroid had produced this action of the heart. The Society was much indebted to Dr Nicholson, and he would fain hope that his paper would mark a considerable advance in our knowledge of this subject.

Dr Keppie Paterson spoke of his experience of the use of thyroid gland, and said he had used it largely for obesity. A gentleman put on thyroid and careful dieting lost 13 lbs. in fourteen days. The result was very rapid action of the heart and great general enfeeblement. The dose used was 5 grains three times a day. He had also used it in cases of fat-loaded hearts in elderly people, and never found it of advantage to go on with large doses. Thyroid extract was a remedy which required careful dosage in each case, and the patient should be under continual supervision.

Dr J. W. Ballantyne said that the impression had gradually come to his mind that there was some truth in the action of thyroid extract in eclampsia. At the same time he thought Dr Nicholson ought certainly to give them a short note in May or June of the cases still pregnant. So far, out of four cases two had had dead-born children, and two cases were not finished, and it would be interesting to hear regarding the infants still *in utero*. Dr Nicholson had not gone into the condition of the thyroid gland in this communication; but it was a very difficult thing to say whether the gland was normal or diminished in size. Dr Ballantyne thought that Dr Nicholson deserved support from them all in his investigations.

The President agreed with the former speakers in thanking

Dr Nicholson, and encouraging him to go on with his observations. All the cases of albuminuria in pregnancy were not cases of albuminuria of pregnancy. The pathogenesis of that disease was not yet discovered. The kidney was not the cause; the liver might be involved, but there was a something, probably a source of sepsis, not yet discovered. He was much interested to notice that in one of Dr Nicholson's cases the woman had three times before had eclampsia—a quite exceptional condition. In one of the cases the woman had gone about as usual. He would not feel justified in allowing a patient with albuminuria to go about, even although she were taking thyroid. If she had albuminuria, he would put her to bed on milk diet. When there was a large quantity of albumen there was not necessarily eclampsia—a certain peculiarity of the nervous system was the determining factor of the fits. He was not sure if Dr Nicholson had said that the toxæmia of a pregnant woman was in inverse ratio to the amount of thyroid secretion, and if Dr Nicholson had made that statement, he would like to know the grounds for it.

Dr Nicholson thanked the Fellows for the way in which they had received his paper, and for the interesting remarks they had made. He was much interested in Dr Milne Murray's case. The patient in that case was, he considered, suffering from hypothyroidism—a condition analogous to that in myxœdema and cretinism, and that might explain the albuminuria, slow pulse, and some of the other symptoms. Cases of myxœdema commonly improved during pregnancy, probably as a result of the increased activity of the thyroid gland, and labour was not complicated by eclamptic fits. Dr Milne Murray's case was highly suggestive in many ways. There might be cases in which there was a very large quantity of albumen due to other causes than extreme puerperal toxæmia. With regard to Case III., where the patient had been in the pre-eclamptic state. She was first treated on 4th January, when the symptoms were most pronounced. The albuminuria was quite away in less than three weeks, and she was up and going about as usual by 4th February. Labour occurred on 10th March. Dr Ballantyne said that the fœtus had not been dead more than five weeks, so that fœtal death did not

occur till the patient had been rid of all her symptoms. With regard to Dr Ritchie's remarks, the patient taking thyroid tabloids had not any albuminuria; she had simply commenced taking them pretty early in pregnancy, in the hope that her labour would thereby be unattended by eclampsia. When he stated that the toxæmia of pregnancy depended on the quantity and activity of the thyroid secretion, he meant that it was a question of metabolism. It was probable that iodothyrin participated in an important manner in controlling the functions of *all* the metabolic organs of the body. Hence its deficiency might lead to a derangement of some part of the mechanism which normally defended the organism against intoxication from intermediate or imperfectly converted products of metabolism. But the statement was made mainly on theoretical considerations.

MEETING VI.—MAY 10, 1902.

DR JAMES RITCHIE, *President, in the Chair.*

I. The following gentleman was elected an Ordinary Fellow of the Society:—C. M. Pearson, M.B., Ch.B., 17 Alva Street.

II. *Professor Simpson* showed—(1) AN ANENCEPHALIC FŒTUS with spina bifida and exomphalos, from a patient in whom there had been hydramnios; (2) OVARIAN TUMOURS, (*a*) dermoid of right ovary, (*b*) a solid tumour of the ovary, of large size, in which the pedicle had been twisted, (*c*) a hydatid tumour of the ovary, removed from a patient aged 28, and in which there had been many strong adhesions to bowel; and (3) BOSSI'S DILATOR:—

Professor Bossi of Genoa, in 1889, proposed the use of an instrument for mechanical dilatation of the cervix. The dilator as now used by Bossi consists essentially of four points or branches, $1\frac{3}{4}$ inches each in length, fitting into each other, so that when the instrument is closed they can be introduced through an undilated cervix. By means of a screw attached to

the ingeniously jointed stems of the points, these can be separated with whatever varying degree of rapidity may seem necessary, and to an extent regulated by a scale attached near the screw. For cases where the cervix is already to some extent dilated, so that a larger instrument can at once be passed, there are provided with steel shields that are slipped over each of the four points, so as at once to increase their bulk and their power of dilatation. When introduced through the cervix, the dilator produces a double effect: *first*, it dilates the canal; and *secondly*, it stimulates uterine contractions. Where the dilatation is being carried on slowly, the instrument may be kept *in situ* by a strap attached to it and carried round the patient's abdomen and thighs, and a turn of the screw made every half-hour or seldomer. For more rapid dilatation, the screw may be turned every quarter of an hour or oftener. In urgent cases, full dilatation of the canal may be obtained by keeping up continuous action of the dilator in fifteen to twenty minutes. When pains are present, the active dilatation is carried out only in the intervals.

The *indications* for the use of the dilator are found in cases—

1. *Of Induction of Premature Labour.*—The instrument has been used successfully in cases where other means of starting uterine action have failed, or have produced only a partial effect, or where from the first it was desirable not only to secure uterine contraction, but speedy dilatation of the os uteri.

2. *Of Forced Labour.*—It has proved serviceable in grave cases of eclampsia; in cardiopathic and tuberculous gravidæ; in cases of hæmorrhage, accidental and unavoidable; and in rigidities of the cervix uteri.

3. *Of Tetanic Incarceration of the Placenta.*

A full description of the dilator, its indications and modes of employment, is given by Professor Bossi in an article[1] of which he has kindly sent me a reprint, and which contains a large series of cases illustrative of the value of his procedure.

I have not had an opportunity of using the Bossi dilator in

[1] "Sulla Dilatazione meccanica immediata del Collo dell' Utero nel Campo Ostetrico," in the *Annali di Obstetricia e Ginecolgia*, 1900.

a case of labour, but I find that it works well in gynæcological cases. Leopold of Dresden has published a series of cases illustrative of its value in labours complicated with eclampsia, in the *Archiv für Gynaekologie*, Bd. lxvi., and again in the *Centralblatt für Gynaekologie* for May 1902. In the *British Gynæcological Journal* for May, Dr Macnaughton-Jones has also commended its employment.

III. *Dr Berry Hart* showed—(1) A specimen of CANCER OF THE CERVIX; (2) a specimen from a case of HYDROSALPINX; (3) an OVARIAN TUMOUR with thick fleshy wall of a malignant nature.

IV. *Dr Haultain* showed—(1) An OVARIAN TUMOUR WITH DOUBLE PYOSALPINX, the former had ruptured into the bowel about five weeks before operation, while pus had escaped from the tube and given rise to acute peritonitis, which was the immediate cause of laparotomy being undertaken. After removal of the tubes and tumour, the peritoneal cavity was thoroughly flushed out and drained through the posterior fornix; the result was successful. (2) A TUBE AND OVARY, which promised to be extremely interesting, as it probably was an example of ovarian pregnancy. He merely showed it at present, as future microscopic investigations would entail the destruction of the gross characteristics which showed the apparent gestation sac to be entirely in the ovary and free from the tube altogether. Should it turn out to be a pregnancy, he hoped to bring it before the Society in detail. (3) A UTERUS removed by vaginal hysterectomy for adeno-carcinoma. The microscopic appearances, which he also showed, were undoubtedly malignant. The patient had been bedridden from hæmorrhage for two years, and had repeatedly been curetted. The gross appearances of the uterus, which he had thoroughly scraped ten days previous to the operation, were apparently healthy, yet the clinical and microscopic evidence was beyond cavil. (4) A DOUBLE MONSTER at the eighth month, which was fused from the umbilicus to the root of the necks. The approximate arms were fused, but two scapulæ were present, as also two hands at the extremity of

the single arm. It presented by the breech, and was delivered by bringing down all four legs and flexing one head below the other. The heads had evidently been in close apposition for a long time, as the approximate sides were markedly flattened, and before birth gave the appearance of a single large head.

V. *Dr Berry Hart* read his paper on "THE DEVELOPMENT OF THE AMNION AND CORD."

Professor Simpson said they were much indebted to Dr Berry Hart for giving them a demonstration of his idea. It was a new idea, and required to be thought out, but he could well believe that breaking down did take place in early embryonic tissue, and that, so far, he was prepared to accept as correct the interpretation of the phenomena Dr Hart had given.

Dr Ballantyne said he quite agreed that Dr Hart's idea was quite a possible explanation of the development of the amniotic cavity, because it rather fell into line with a great deal that had recently been done in the investigation of embryological processes. There were three points, each having its bearing, which supported this conclusion:—(1) That which takes place in a chick embryo does not necessarily take place in a human embryo, for what takes place in one embryo need not take place in another. (2) That the principle of coming and going (should he call it?), of tissue building up and breaking down, seemed to hold in the embryo, and that there was nothing extraordinary in the idea of an epiblastic plug growing in and breaking down again. (3) It helped to the explanation of a great many teratological phenomena; for example, where there was not simply an amniotic band but a solid connection (as of muscle in a recent specimen) binding a hand to the chest wall. If the epiblastic plug were first embedded in mesoblast, and this was hollowed out again, they could better understand such things. Though the details might be modified, possibly the explanation given might hold good. It might also be admitted that the amniotic cavity in the human subject may be formed, neither as in the chick (by folds), nor as in the hedge-hog (by an epiblastic plug), but in a third way, differing from both these.

VI. A CASE OF ACUTE PYELITIS IN INFANCY.

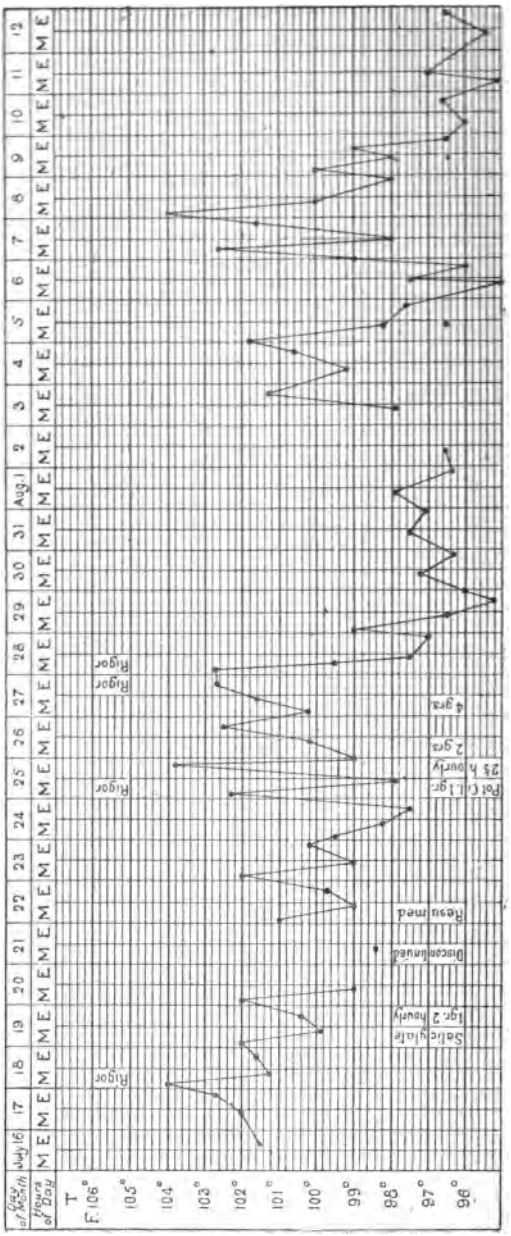
By JAMES RITCHIE, M.D., F.R.C.P.E., M.R.C.S.Eng., *President.*

ACUTE PYELITIS in the adult is discussed at considerable length in text-books, but very little is found in pediatric literature regarding the disease in infancy. As the symptoms may be alarming and the affection stubborn unless suitable treatment be adopted, the case about to be described seems to be of sufficient interest to warrant the recording of it.

On 14th July 1901, the writer was called to see G. H., a female baby, 7½ months old. She had been fed on sterilised humanised milk, was well nourished, and had always enjoyed good health, except that her bowels had been costive and the motions often pale. Early on the morning of the 14th she had a rigor, consequently medical aid was sought. When the child was seen the temperature was only slightly above normal; nothing was found in the various systems, except that the bowels were costive, the motions pale; at the anus was a small crack; it was stated that the child sometimes cried when the bowels moved, and at times a streak of blood had been observed on the motions. The percussion note over the chest was clear, but the respiratory murmur was feeble and the breathing shallow. Micturition was normal, the urine clear, acid; no albumen was found on boiling some in a spoon at the patient's home. In the absence of evidence of disease elsewhere, the ears were examined, with negative result. As the child cried on being moved, was reddish fair, and both parents were of markedly rheumatic constitution, the provisional diagnosis was, a chill in a child of rheumatic constitution. The treatment was hygienic, with small doses of spiritus etheris nitrosi, tincture of belladonna, and glycerine. On the 18th there was another rigor; careful examination did not reveal any change in the physical condition; sodium salicylate, 1 grain every two hours, was substituted for the former medicine. On the morning of the 20th temperature was 99°, and on Sunday the 21st it was normal. Believing that the illness was probably at an end, the medicine was stopped. Next morning, as the thermometer registered 101°,

the salicylate was resumed. The temperature continued to vary greatly (see Chart); when it was not much raised, the child was happy and comfortable, except that movement seemed to trouble her; she fed as usual; but when the temperature rose she was much distressed and the breathing rapid, out of proportion to the amount of fever. On the 25th, having failed to discover the cause of illness, the writer asked Dr John Thomson to see the child. After having examined her, with the exception of the urine, he said that, by a process of exclusion, he had formed the opinion that probably there was pyelitis. A specimen of urine, taken with suitable precautions, was found to be very acid, not clear; it contained a trace of albumen (in proportion to the pus); microscopic examination revealed some pus corpuscles, and a multitude of bacteria singly and in clumps. There were no tube-casts. The treatment advised was potassium citrate, 1 grain every two and a half hours, to be cautiously increased until the urine was neutral, the milk to be much diluted with the object of rendering the flow of urine copious and little irritating. The child was kept in one room during the day, and in another at night. The day following, as she seemed to be more uneasy on movement of the body, sodium salicylate ½ grain was added to each dose of the medicine. On the 27th the dose reached was potassium citrate gr. 4, sodium salicylate gr. ½, every two and a half hours. That evening and the following morning there were rigors; but thereafter the temperature fell. On 3rd August it again rose, and continued to vary greatly, but after the 9th it remained below normal; for some days it was very low. About the 28th the urine was for a short time neutral, but as the potash was depressing the child and the temperature was subnormal, the dose was diminished. The amount of pus was never large. Although for a considerable time the urine contained flakes with pus, the child made uninterrupted progress after the 9th, and, in five weeks from the commencement of the illness, she was sent to the country. In October, when the urine was examined, it contained no bacteria.

Baginsky reports four similar cases. He sums up their characteristics thus:—1. Severe gastric symptoms, loss of


Rigor
Salicylate
Discontinued
Resumed
Pot. Cit. 1 gr.
2 hourly
4 grs.
Rigor
Rigor
Rigor
T
F.
106°
105°
104°
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appetite, sickness, pain in the region of the kidneys, and the long continuance of these symptoms. 2. Constipation—one of his cases had membranous material surrounding hard scyballa. 3. The variable character of the urine—at times clear and free from morbid material, at others cloudy, showing serious changes, and containing pus, etc. 4. Well-marked but irregular variations of temperature. 5. The existence in large quantity in the urine of bacillus coli communis.

All of these conditions were exhibited by the above case, with the exception of gastric symptoms, loss of appetite, and sickness. In three cases recorded by Holt the onset was abrupt, with a rigor, as in the case just reported. In his third case, as in the above, when the temperature fell the child seemed to be perfectly well and ready to laugh, but severely prostrated when the temperature rose. The same irregular and great variations of temperature occurred in his cases also. To account for this variability there are probably two factors, viz., the sensitiveness of the pelvis of the kidney and the early age of the patients. In Holt's cases tenderness over the kidneys was not observed, whereas in Baginsky's four cases, and in the above, tenderness was present; indeed, in the case just recorded, after a diagnosis was made, the writer believed that the shallow respiration was due to the discomfort which was produced by deeper inspiration. The existence of tube-casts in some cases is due to an extension of the inflammation to the kidney substance, and is not necessary to the disease.

Etiology.—Acute pyelitis may be caused by irritating drugs; most frequently it arises in connection with irritation by renal calculi; it may also be secondary to local conditions. It is sometimes due to extension of septic inflammation from the bladder; Siebert, at the discussion of a paper by Holt, said that in pyelitis pure and simple there was only one way of infection, and that was from the bladder upward. This is uncommon in children; and in the case above reported, as well as in those of Baginsky, there was no vulvo-vaginitis. Acute pyelitis also arises in the course of infectious diseases—scarlet fever, typhoid, diphtheria, malaria and pyæmia—but it occurs also as a primary disease independently of the above causes, and it appears probable that it is due to the presence in the urinary

tract of the bacillus coli communis. Baginsky in discussing the question experiences difficulty in the fact that the bacillus coli is found in the urine of children who have no symptoms of illness, and who at least have no symptoms of pyelitis. Escherich, Trumpp, and Finkelstein have recorded the existence of cystitis in consequence of the entrance into the bladder of the bacillus coli communis. Baginsky points out that there are three channels of infection, viz., through the blood-stream, by the lymphatics, and by the urethra. Although the majority of the cases of acute pyelitis in infants occurred in girls, the rule is not an invariable one; we cannot therefore conclude that infection occurs through the urethra only. The researches of Posner and Lewin, of Marcus, and of Bosner and Cohn, have demonstrated that the bacillus coli communis and other organisms can pass through the intestinal wall into the general circulation, into the peritoneal cavity, and into the urine; also that whereas this is unlikely to occur in health, the frequency of their passage increases with the morbidity of the intestinal wall. Posner and Cohn believe that the organisms found entrance to the kidney by means of the blood-stream because when the renal artery had been previously ligatured the kidney remained sterile. Roos administered pure cultures of bacillus coli communis to several persons, and found that it acted as a laxative, and eventually produced diarrhœa. He therefore concludes that it has an irritating effect. When the bacillus had been previously killed, these effects did not take place. It is known that the bacillus coli varies greatly in virulence. If, as is probable, this organism is a cause of acute pyelitis, it must be present in a virulent form. It is noteworthy that in most of the cases above referred to there was constipation. In the writer's case the pale colour of the stools indicated a want of bile—the natural antiseptic of the bowel—this may have favoured the development of virulent characters in the bacillus. The constipation and the crack at the anus afforded a ready gate of entrance to the circulation-blood or lymph-stream, and as the child was of rheumatic constitution, the acid condition of the urine presented a favourable nidus for growth of the organism.

Diagnosis.—The condition may be suspected in any case

which presents considerable and perhaps irregular variations of temperature with apparent integrity of other systems. The condition of the urine—acid, with pus and bacteria—will complete the diagnosis. Cystitis may be excluded by the absence of painful and frequent micturition. The fact may, however, be recalled, that in adults it is not uncommon to have pronounced bladder symptoms in cases which are primarily pyelitis. The amount of pus varies; in some of Holt's cases it was large, in the above case it was never great. In Holt's cases there was no tenderness on pressure over the loins, but in Baginsky's and the above it was well marked. In the one just recorded there was also tenderness on pressure over the abdomen, and the writer believes that the shallow breathing had this as a cause.

Treatment.—This consists chiefly in rendering the urine neutral, and so removing the condition necessary for the growth of the bacillus; the maintaining a copious flow of urine, so as to render it as little irritating as possible to the inflamed tracts, also general hygienic care. In the above case marked improvement followed the use of sodium salicylate, the symptoms became worse when it was stopped. The existence of constipation and of anal fissure may require special treatment.

LITERATURE.

HOLT—*Archives of Pediatrics*, xi., 1894, p. 808.
HOLT—"Diseases of Infancy and Childhood," 1897, p. 627.
BAGINSKY—*Archiv f. Kinderheilkunde*, xxiv., 1897, s. 232.
MARCUS—*Zeitschrift f. Kinderheilkunde*, xx., 1899, s. 427.
POSNER and COHN—"Ueber die Durchgänigkeit der Darmwand f. Bacterien," *Berlin. klin. Wochenschrift*, 3rd Sept. 1900.
ROOS—"Zur Behandlung der Obstipation," *Münch. med. Wochenschrift*, 23rd Oct. 1900.

VII. NOTES ON THE SYMPTOMS AND TREATMENT OF ACUTE PYELITIS IN INFANTS.

By JOHN THOMSON, M.D., F.R.C.P.Ed., Physician to the Royal Hospital for Sick Children.

IN 1894 Dr L. Emmet Holt published an excellent paper on "Three Cases of Acute Pyelitis in Infancy" in the *Archives*

of Pediatrics. The account which he gave of these cases, and especially their temperature charts, must have given to many who studied them, besides myself, a feeling that they had probably overlooked the disease hitherto, and a determination not to do so again. Since reading Dr Holt's paper, I have met with the condition eight times; it cannot, therefore, be very rare. Undiagnosed, it is an alarming illness, but under proper treatment it is a very curable one. These considerations, and the fact that our President is reporting one of these cases to the Society this evening, induce me to offer the following notes on my experience of its symptoms and of the effect of treatment upon them.

Clinical Features.—My patients were all girls, and their ages were as follows:—

Baby *A*,	7½ months.	Baby *E*,	14 months.
Baby *B*,	10 „	Baby *F*,	14 „
Baby *C*,	10 „	Baby *G*,	18 „
Baby *D*,	12 „	Baby *H*,	20 „

Many of the cases which have been hitherto published have been in infants under two years, but the disease occurs in older children also, and presents very similar symptoms in them. In almost all the published cases the patients have been girls, but Holt has described one well-marked case in a boy of fourteen months.

In one of my cases (*A*) the parents were very rheumatic; in one (*H*), and very possibly in more, there was a family history of gout. In six of the children the previous health had been excellent. In the other two (*D*, and *H*) there had been, and there still persisted, a state of severe chronic dyspepsia and rickets. They had all been artificially fed, some of them injudiciously, but there had been nothing very peculiar about their dieting.

In several of the cases there was a distinct history of a predisposing illness. The two first children seen were suffering from infantile scurvy. In one of these (*H*) this disease had been protracted and recurrent in an unusual degree;[1] in

[1] For an account of this case, see *Pediatrics*, 15th Sept. 1896, p. 265.

the other (*B*) it was very slight. There was no trace of scurvy discovered in any of the other patients. In two cases, at least, the children had been weakened by an attack of influenza about a month before the onset of the pyelitis. None of them had ever been near any district in which malaria existed.

In all the children but one (*E*) there had been troublesome constipation; in some of them there had been occasional diarrhœal attacks. In several, glycerine injections or suppositories had been used for a prolonged period. In five, at least, there was a history either of soreness about the anus or pain during the act of defæcation, or blood seen in the motions.

Symptoms of General Disturbance.—The symptoms seem generally to have begun rather suddenly with a rapid rise of temperature, so that pneumonia or influenza were suspected. In none of my cases was the onset of the pyrexia accompanied by a convulsion; but in no less than four of them (*A*, *C*, *E*, and *G*), and possibly in more, there were one or more severe chills or rigors. In one of these (*E*) the chill was not severe, and was described by the friend with whom I saw the child as "something like a rigor." In two at least of the others (*A* and *G*) the rigors were frequently repeated and were extremely severe, quite like those seen in adults.

The occurrence of rigors in young infants with acute pyelitis is an interesting point, and one which may sometimes be of practical assistance in the diagnosis, when a specimen of the urine has not been obtained. Even in malaria, well-marked rigors are said to be rare under two years, although they do sometimes occur. Their place at this age is generally taken by convulsions, or they may be represented merely by a slight coldness of the extremities. In most other circumstances in which an adult would take a rigor a young infant does not do so, although he may perhaps have a convulsion. The four cases here referred to are the only instances in which I remember to have seen young children who had rigors; and I have not been able to find an account of any case in which this symptom occurred in a child under two years, who had not malaria without there being pus in the urine.

Two or three of my patients appeared to be delirious, and two of them (*B* and *E*) were seen to squint frequently.

A little vomiting sometimes occurred, and in two or three of the cases the respiration-rate was accelerated as compared with that of the pulse, although no pulmonary disease could be made out.

The temperature (see Charts [1]) reaches a high level, and is frequently above 104°. Its type is more or less remittent, and the chart looks somewhat like one of enteric fever. The rapid effect of the treatment on the temperature is very striking.

Another marked characteristic of the disease is the extreme restlessness and distress which the children display. The apparent discomfort is not, however, continuous. At times the infant may seem quite at her ease, but she soon relapses again into a state of obvious misery. This makes her often look very ill indeed, and yet, considering the degree of the pyrexia and the other serious symptoms, there is not, as a rule, very great prostration. The appetite is often well maintained, and consequently the emaciation, although steady, may not be very rapid.

Local Symptoms.—The symptoms pointing directly to disease of the urinary apparatus are often so slight and so indefinite that their significance is apt to be overlooked. In five at least of the cases there was a history of screaming attacks, apparently due to pain of the nature of colic. Micturition had been accompanied in two by some uneasiness, and in other two occasionally by slight pain. In five, as already mentioned, there were symptoms which suggested the probable recent presence of some excoriation or fissure of the anal mucous membrane. In two of these there was also some soreness of the vulva. Tenderness on palpation of the kidney region seemed to be present in two cases (*A* and *H*). The presence of this symptom, however, was difficult to make sure of, as several of the children showed considerable general muscular tenderness and resented handling of any sort.

The State of the Urine.—The reaction of the urine before treatment was always acid—generally extremely so. In one case only (*G*) was a peculiar fœtid odour detected, and

[1] I have to thank Dr James M'Lauchlan for Chart 1, and Dr H. L. M'Kisack for Chart 2.

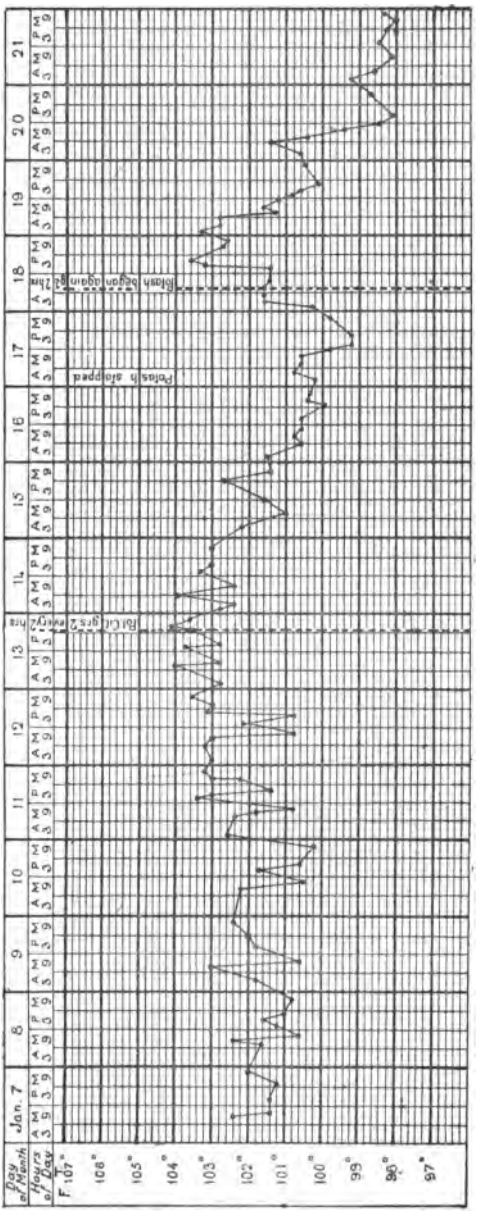

CHART 1.
Acute Pyelitis. Baby *B.*, 10 Months Old.
Shows effect of intermitting the Potash Treatment.

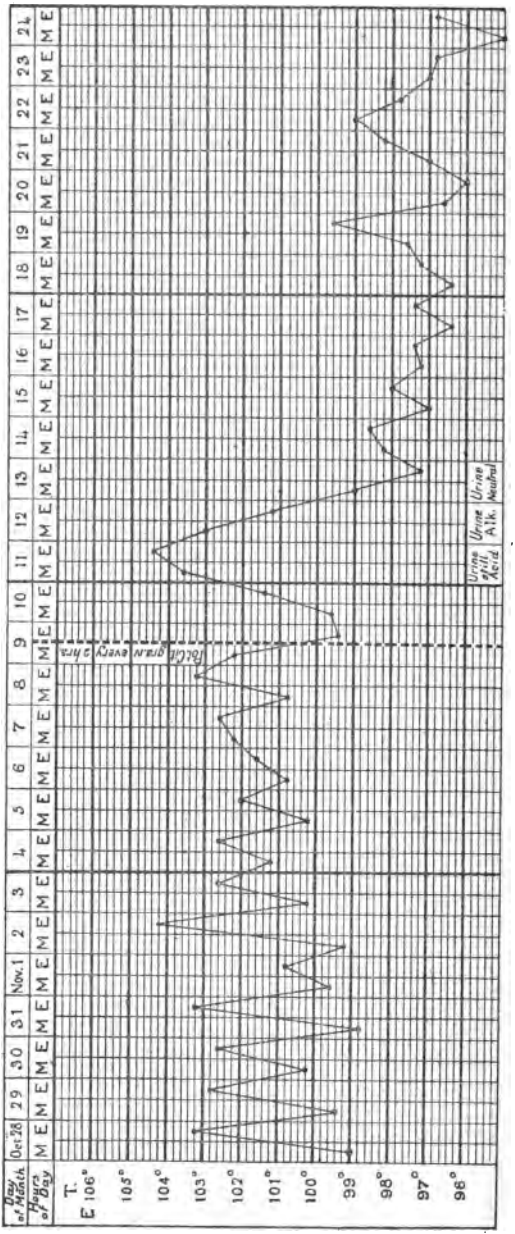

CHART 2.
Acute Pyelitis. Baby *G.*, 18 Months Old.
Shows effect of continuous Potash Treatment.

that was at the time the symptoms began. Albumen was always present in small amount, but in no case was there much more than might be accounted for by the pus cells present. I did not find tube-casts in any of the cases, but the amount of urine available for examination was usually very small.

Pus was always present in considerable amount; sometimes the urine was turbid with it. A few epithelial cells of various forms were usually to be seen. Blood I never detected, except in one case (*H*), in which there had been scorbutic hæmaturia not very long before. Bacteria are always visible in large numbers in the freshly-passed urine, and cultures from it give pure growths of the bacillus coli communis.

No crystals were found, at the time of the illness, in any of the specimens of urine which I examined; but in two at least of the cases (*D* and *H*), large quantities of uric acid and oxalates had been passed shortly before the symptoms of pyelitis began.

Etiology.—As I am dealing now mainly with the symptomatology and treatment of the condition, I must only touch very briefly on the subject of its causation.

The pathogenic organism in these cases is the *bacillus coli communis* first described by Escherich. Its natural home is in the bowel, and it is the chief micro-organism found there. In its proper place its effect is presumably a beneficial one; but when it finds its way into other cavities and other tissues, it is often a cause of serious disease.

Bacteriologists have proved that it may pass from the bowel into the urinary tract by any one of three ways—(1) by the blood-stream; (2) by the lymphatics; and (3) from outside up the urethra. The great preponderance of females among the individuals affected seems to suggest that the last named is probably the most frequent pathway for the infective organism. The mere implantation of bacillus coli in the healthy urinary tract is not sufficient to excite inflammation there (Melchior), there must also be a lowering of the vitality of the tissues with which the bacilli are brought in contact. It is probable that such antecedent diseases as scorbutus and influenza may, along with some local irritation, play an important rôle in predispos-

ing to the disease. It seems quite likely that excoriations in the anal region may also be a factor in the causation of the disease.

Diagnosis.—This depends mainly on the presence of pus and bacilli in the urine along with high fever, and on the absence of other causes of these conditions. The chief facts, apart from the examination of the urine, which suggest that a case may be one of pyelitis, are:—

1. The pyrexia and the extreme distress, without any sign of organic disease in any other system sufficient to produce them.

2. The presence of rigors, especially if the patient be a child under two years, if malaria can be excluded.

3. Any local tenderness or pain on micturition serves, of course, to draw attention to the urinary tract.

Prognosis.—Under proper treatment the cases improve with striking rapidity, so far as the temperature and the subjective symptoms are concerned. Several weeks, however, usually pass before the pus disappears from the urine. The bacteria may remain very much longer, but they seem to have lost their pathogenic properties to a large extent, and cause neither suppuration nor subjective phenomena.

All my cases recovered complete health, with the exception of one (*D*), who died some months later from other causes altogether. In this case there was no recurrence of the pyelitis.

Treatment.—The main, and the only essential treatment consists in *rendering the urine neutral by the administration of alkaline remedies* as speedily as possible, and in keeping it so until all the symptoms have disappeared. When this indication is thoroughly carried out, its good results are very remarkable. The pain and uneasiness vanish, and the temperature rapidly falls and remains below normal (see Charts). After the pus has ceased to be present in the urine, we find that, with ordinary tonic measures, the urinary tract seems able to defend itself; the organisms cease to cause trouble, and in time they also, doubtless, disappear. I have not, however, watched any case sufficiently long and closely to have evidence on this point.

The alkaline which I have always made use of has been citrate of potash, and it has to be given freely before the urine

loses its acidity. In less severe cases, 24 grs. per diem may suffice for this purpose, but it is best to begin with 36 to 48 grs. in the twenty-four hours. Although this amount of alkaline is extremely beneficial to the local condition, and rapidly allays both the pain and the fever, it always exerts a depressing action on the general system. The child's temperature becomes subnormal, she seems flabby and nauseated, not infrequently vomits, and may have diarrhœa. No harm, however, follows this temporary depression, and the medicine should be steadily persevered with. I have several times seen the temperature rise again, and the uneasiness return when the potash had been prematurely discontinued or diminished (see Chart 1).

Of the fact that neutralisation or alkalinisation of the urine destroy the bacteria, or at least destroys their virulence, there can be no doubt whatever. Why this should be so when in the natural habitat of the organism in the bowel it flourishes in an alkaline medium, seems somewhat hard to explain.

Antiseptics, when given alone in these cases, are not very efficacious; but in addition to the alkaline treatment they are sometimes distinctly helpful in accelerating the disappearance of the pus. I have seen most good from salol, in doses of one or two grains. Urotropin has seemed much less active in these cases than it often is in other cases of pyuria in which the urine is alkaline. Creasote was found very useful in one case by Baginsky. Boracic acid I have not tried.

Antipyretics have little permanent effect on the temperature, and they are quite unnecessary if the alkaline is given freely enough. Holt tried enormous doses of quinine with curiously little effect.

Sedatives are also unnecessary, owing to the rapid relief afforded by the potash.

It is important that the child should be encouraged to drink as much fluid as possible.

The main conclusions of this paper may be stated as follows:—

1. In infant girls, when debilitated by any cause, acute pyelitis may be set up by the immigration of the bacillus coli from the bowel.

2. The presence of the disease is sufficient to occasion very

high fever, extreme distress, and a copious deposit of pus and bacteria in acid urine.

3. Unlike any other disease (except malaria), it frequently causes rigors, even in young babies.

4. The presence of anal excoriations has possibly an important etiological significance in these cases.

5. The prognosis (when the case is treated) is altogether favourable, although complete recovery is sometimes delayed for many weeks.

6. The only essential treatment consists in the thorough and long-continued neutralisation of the acid in the urine by the administration of alkaline remedies.

Literature.

Clinical:—

A. Baginsky—"Weitere Beitrage zur Pathologie der Nierenerkrankungen im Kindesalter," *Arch. f. Kinderheilk.*, xxii., s. 232, 1897.

S. J. Gee—"On Some Kinds of Albuminuria and Purulent Urine in Children," *Brit. Med. Journ.*, 17th Nov. 1883, p. 961.

L. Emmett Holt—"Three Cases of Acute Pyelitis in Infancy," *Arch. of Pediatrics*, Nov. 1894.

A. Monti—"Pyelitis in Childhood," *Med. Press and Circ.*, 3rd July 1893, p. 1.

R. W. Raudnitz—"Ueber einige Ergebnisse der Harnuntersuchung bei Kinder," *Prager med. Wochenschr.*, xxvi., No. 45-30, 1901.

David L. Wolfstein—"Pyelitis in Infancy," *Arch. f. Pediatrics*, May 1896, p. 342.

Bacteriological:—

Escherich—"Das Bacterium Coli als Cystitiserreger," *Centralbl. f. Bact. u. Paras.*, Bd. xv., 1894, s. 901.

Ali Krogius—*Recherches bacteriologiques sur l'infection urinaire*, Helsingfors, 1892.

Max Melchoir—*Cystitis und Urininfektion*, Berlin, 1897.

POSNER and LEWIN—"Ueber Selbstinfection von Darme aus," *Deutsche med. Wochenschr.*, 14th Feb. 1895 (V. S. 28).

WREDEN—"Zur Aetiol. der Cystitis," *Centralbl. f. Chirurgie*, 1893, No. 27.

Dr Haig Ferguson thanked the President and Dr Thomson. He did not catch what was said about the presence of uric acid in the urine, as to what weight it had as an etiological factor. He could recall two cases of children of very gouty parents, who were much out of health, irritable etc., and the nurse had called his attention to the fact that there was blood in the urine. On investigation there was blood, and also clusters of uric acid crystals. He was under the impression that these came from the pelvis of the kidney, and in both cases administered spt. etheris nitrosi. This caused a free flow of urine, and the crystals and blood at once disappeared. He thought Dr Thomson had mentioned uric acid as a factor in some of these cases of pyelitis, and they knew that uric acid was very frequently passed in the urine of young children.

Dr Ballantyne said he had listened with very great interest and profit to the President and Dr Thomson. With regard to the papers themselves, he fancied Dr Thomson had gathered together all that was worth saying on the subject. Two things had struck him as worth emphasising:—(1) That if a young infant had rigors, it must be suffering from pyelitis; for, in this country at least, malaria could be practically excluded; (2) the necessity of warning parents about the slowness of recovery.

Dr Berry Hart asked if children with acute suppuration did not suffer from rigors.

Dr Haultain said they were much indebted to the President and Dr Thomson for their communications. Personally, he had had no experience of the disease; it was quite new to him. He would like to ask Dr Thomson what was the usual course when these cases were untreated.

Dr Fordyce said he joined with the others in expressing his gratitude for these interesting papers. He would, in future, be on the lookout for these symptoms. He would like to ask Dr Thomson how he set about getting a specimen of the urine in such very young children.

Dr Darling asked if there had been a post-mortem in any cases of the disease.

Dr Keppie Paterson said the treatment was the part of the paper that interested him most. He wondered urotropin had not been more used, as it was probably the best antiseptic for the urinary tract.

Dr Church asked if dieting had anything to do with this condition with regard to the acidity of the urine.

The President, in reply, thanked the Society for their kind reception of his paper. With regard to the occurrence of rigors and of convulsions in diseases, convulsions are more an indication of the constitution of the child than of the nature of the disease; rigors are induced by rapid rise of temperature, rapidity of rise and variability are characteristic of pyelitis in infancy. As to treatment, in recorded cases several methods had been tried without success, the treatment by alkalies had alone been beneficial. He had been much astonished at the relatively large dose of alkali which had been required in his case to render the urine neutral.

Dr John Thomson, in reply, thanked the Fellows for the kind way in which they had received his paper. He would try to answer some of their questions. With regard to the course of untreated cases, and as to post-mortems, he did not know very much about them. He had not met with a case in which there had been a post-mortem examination. Untreated cases seemed to go on and on. As to rigors, that was a point he wanted to make. In suppuration elsewhere, they did not get rigors in children under two years of age. In surgical books he had looked up, and in one paper he had found on the subject, there was no case under four years of age in which there had been rigors where there was not pus in the urine. As to uric acid as a cause of pyelitis in new-born children, he had no doubt that predisposing diseases were of importance. Scurvy and influenza were supposed to lessen the vitality of the tissues. He did not see, however, why in so doing they should specially weaken the vitality of the pelvis of the kidney. It looked, therefore, as if some local irritant in that situation might have something to do with this special local vulnerability. He had forborne going into this subject, as he was not perhaps competent

to discuss the pathology, and it was not the subject of the paper. It seemed to him likely that uric acid crystals had something to do with it. In two of his cases there had been large quantities of these crystals. New-born babies not getting enough breast milk and too little fluid, were very apt to pass large uric acid crystals, giving rise to blood in the urine. In older children, uric acid in the pelvis of the kidney might probably cause irritation. He did not know of any special diet in regard to these cases. In some, the diet had been carefully looked after; in others, it had been very injudicious. As to urotropin, he had tried it in one or two of his cases, but it did not seem to have much effect if the urine was acid. He had read of others who had tried it without success, and it was found that in cases of acid urine, urotropin had very little effect. As to the question of obtaining the urine, it was not easy; it usually depended on the amount of pressure brought to bear on the nurse. It was, of course, only small specimens that one could obtain, unless a catheter were used.

MEETING VII.—JUNE 7, 1902.

DR JAMES RITCHIE, *President, in the Chair.*

I. The following gentleman was elected an Ordinary Fellow of the Society:—Ewen J. Maclean, M.D., 10 Park Place, Cardiff.

II. *Dr Barbour Simpson*, for *Professor Simpson*, showed—(*a*) TWO SMALL FIBROID UTERI, which, although small, had given rise to marked pressure symptoms on bladder and rectum—both removed by the supra-vaginal method. (*b*) A SLOUGHING PORTION OF A FIBROID TUMOUR OF THE UTERUS, removed by chain écraseur. The prolapsed portion had come down from time to time, but the patient had always been able to replace it herself until the last time. (*c*) THREE SPECIMENS OF EXTRA-UTERINE GESTATION. Professor Simpson had in the last few months operated successfully upon eight cases of this condition, and in five of these eight cases there had only been one previous pregnancy: (1) from patient æt. 33, amenorrhœa of

six weeks—rupture into abdominal cavity, with a good deal of clot in the pouch of Douglas; (2) specimen showing a very minute opening in the sac, where it had ruptured during removal; (3) patient æt. 30, six months' amenorrhœa—quickening, and the usual symptoms of pregnancy were noticed; no movement for six weeks previous to operation. Four days before operation, decidual cast was passed *per vaginam*. On 8th August the abdomen was opened and the sac removed entire. (*d*) A SMALL CYST shown *àpropos* of Professor Kynoch's paper on Repeated Ovariotomy. The patient had been operated on in the autumn of 1900, and a large ovarian cystoma removed. In May of this year a tumour of the other ovary developed, growing into the broad ligament, and this was the specimen. (*e*) SMALL PAROVARIAN TUMOUR AND CYSTIC OVARY from same side, removed entire. (*f*) SPECIMEN from patient seen in Professor Fraser's Ward, who had complained of pain in the right side, and had a temperature of 102°. In addition, the patient had some pleurisy with effusion. The abdominal symptoms became more pronounced, and the patient to every appearance was moribund. Professor Simpson, diagnosing the case as one of an ovarian tumour with twisted pedicle, opened the abdomen, from which a large quantity of blood welled out, and continued to flow until the pedicle was secured by ligature. A portion of the tumour had become gangrenous, and had burst into the abdominal cavity. Three to four pints of saline fluid was introduced into the abdomen before closing the abdominal wound, and the patient, although suffering considerably from shock both before and after the operation, made a perfectly satisfactory recovery.

III. *Dr Berry Hart* showed—(*a*) A DERMOID TUMOUR OF THE OVARY. The patient had been sent into the Maternity, with a history of obstruction to labour. There was a swelling to be made out in the pouch of Douglas, which in the genu-pectoral position was quite easily pushed back into the abdominal cavity. The os was well dilated; forceps put on, and the patient did well, and was eventually admitted to hospital to have the tumour removed. The question arose, What was the best treatment in these cases? Should they be operated upon

immediately after delivery, or, as in the present case, should one wait till they were well over the puerperium before opening the abdomen and removing the tumour? In this case Kuster's sign (a retroverted uterus, with tumour on the right side) had been noted when the patient was admitted to hospital. In the Maternity the tumour was on the left side after reposition. (*b*) HÆMATO-SALPINX, due in his opinion to a tubal gestation, though there was no history of missed period or pain. (*c*) A PIECE OF WHAT HE TOOK TO BE A PIECE OF THE CERVIX, from a case seen in the country with a doctor, where, after easy delivery with forceps, a structure was seen lying in the vagina protruding through the vulva. Dr Hart was called in consultation, and on examining this protrusion found the narrow end continuous with the anterior lip of the cervix, a broad end lying up in left parametrium. Dr Hart took it to be a case in which there had been a rigid os externum, with cervix soft above, and that the cervix had torn parallel to the os externum above on the left side. The piece was ligatured and removed.

IV. *Dr Haig Ferguson* showed—(*a*) A FIBROMA he had removed from the anterior vaginal wall in its upper part. It was easily enucleated, but was pretty closely attached to the bladder. It was interesting as being the rarest of vaginal neoplasms. (*b*) A STRUCTURE LIKE A LARGE BLOOD-VESSEL, which he had found in the broad ligament during an ovariotomy for a parovarian tumour—probably a dilated Gartner's duct (Wolffian duct). It was of the calibre of the brachial artery. Dr Shennan reports that "The wall of the tube is composed of several layers of unstriped muscular tissue, with a good deal of fibrous tissue as well. The lining is not at all distinct, but has most probably been endothelial or flat epithelial. It is very difficult to say whether it is blood-vessel or not. If so, it is not artery, but might be vein. It resembles somewhat other vessels in the section, but does not possess any elastic lamina as they do; so that I would just diagnose it as a tube with muscular walls, and probably endothelial lining. The ureter is the most nearly related tube to it that I know." Clearly it could not be the ureter, as, in the first place, it was far from the

normal situation of the ureter; and, secondly, the patient recovered without a bad symptom, and she remains perfectly well seven months after operation. Its resemblance to the ureter bears out the contention that it is a persistent Wolffian duct, owing to their close developmental relationship. Nagel is inclined to believe that the condition of double ureter which has been described by several writers, is in reality that of persistent Wolffian duct. It may be noted that there were no varicose veins visible in the broad ligament at the operation. (*c*) SMALL FIBROMA, causing great pelvic pain, removed from the broad ligament of a patient on whom double oöphorectomy had been performed five years before. The patient still continued to menstruate in spite of the removal of the ovaries, and she complained of great pain on the left side, running down into the left labium majus. Dr Ferguson thought possibly some part of the left ovary might have been left, but on cutting up the tumour, which lay very much in the position of the left ovary, no ovarian tissue could be found, and it was pronounced by the pathologist to be a simple myoma. Since the operation, the pain in the left side and left labium majus has ceased. Apparently the tumour had been pressing on the round ligament, as the pain complained of followed the course of the ligament. The operation was troublesome, owing to dense adhesions of the small intestine to the abdominal wall at the former cicatrix, causing kinking and threatened intestinal obstruction. There was also a small abdominal hernia, which Dr Ferguson dealt with at the same time.

V. NOTES ON A CASE OF EPITHELIOMA OF THE VULVA; OPERATION; RECURRENCE.

By D. A. CALLENDER, M.B., Ch.B.

ON reviewing the literature of tumours of the female sexual organs, internal and external, it is found in 16,637 cases, 7479 were of a cancerous nature, and of these, 72, or 1 per cent., were vulvar. So comparatively rare is this latter condition,

that the following notes of a case I have had under my observation for some months past may be of interest.

On 24th October 1901, I was called to see a lady, aged 63, unmarried, who was suffering from intense itching and irritation in the neighbourhood of the vulvar orifice; so much so, that on the slightest exertion, and on sitting down, there was great pain and discomfort. There was also scalding pain on micturition. Considerable mental depression was present.

Clinical History.—For two years she had been troubled with small nodular swellings on the inner surface of both labia majora, occurring in rapid succession, ultimately breaking down, and giving rise to deep ulcers, with the secretion of a good deal of discharge, yellowish-white in colour, and at times blood-stained. She had also suffered from most persistent eczema of the face and legs. Menstruation began at 14, was regular till 40, but from that time till within three years ago there were hæmorrhages every fortnight. As regards the family history, her father died of cancer of the lip, and a sister of cancer of the breast.

Physical Examination.—The general health was not markedly impaired. There was only very slight emaciation present. The urine contained neither albumen nor sugar, though at times she described it as being thick and muddy. The heart and lungs were healthy, and her appetite was fairly good. Round the pudenda there was redness and irritation, with fissures extending on to both thighs. There was considerable hypertrophy and induration of the right labium majus, with shallow superficial ulcerations on the vaginal aspect of the labium, and the secretion of a large amount of yellowish-white discharge. The right inguinal glands were slightly enlarged. On vaginal examination the pelvic organs were healthy, and there was no induration of the cervix. The left labium appeared normal, and no glands could be felt in the left groin. Nothing abnormal could be felt *per rectum*.

Treatment.—The diagnosis of lupus being made, an ointment containing cocaine and creosote was applied to the parts. This was followed by soothing applications—*i.e.*, lead and opium lotion, with alkaline baths night and morning. The following week the ulcerated surface was touched with silver nitrate,

followed by a slight diminution of the pain and discharge. A week after this it was cauterised with Paquelin's cautery, and a lotion containing zinc chloride gr. ¼ to water ʒi. was ordered. A small piece of the ulcerated surface was removed for pathological examination, the result of which proved it to be of an epitheliomatous nature. During the next fortnight the appearance of the part altered. Instead of a bare, shallow, ulcerated surface, small warty outgrowths made their appearance. Dr Ferguson, who saw the case with me in consultation, advised operation, which was performed by him on 23rd December 1901.

Operation.—An incision was made from the groin down the outer margin of the indurated area to within half an inch of the rectum. A vaginal incision was also made from the lower end of the first incision to the upper part of the tumour. The growth was removed along with the glands in the groin, both of which were very hard, and to the naked eye presented the features of an epitheliomatous condition. The skin was stitched to the vaginal mucous membrane, and the wound healed fairly, with some slight suppuration. Part of the clitoris and left labium were removed for microscopical examination. The clitoris was normal, but the left labium showed a suspicious change at one point.

Remarks, and Further Report of the Case.—In the first instance, considerable difficulty was experienced in coming to a definite conclusion as to the nature of the case. Before the result of the microscopical examination was made known, it presented all the appearances of lupus vulvæ, or that condition described by Huguier as herpes l'esthiomëne—*i.e.* hypertrophy of the labium, with ulceration and secretion of pus. There was slight enlargement of glands in the groin to begin with. Later the swelling became much harder, and the ulcerated surface showed small warty outgrowths. The glands in the groin rapidly increased in size, and also became much harder. Considering the age of the patient and the history of malignant disease in the family, together with the stony hardness of the swelling, with shallow ulcerations and the implication of neighbouring inguinal glands, one felt justified, apart from microscopical examination, in diagnosing cancer.

Microscopically, typical cell-nests were seen, with consider-

able small cell infiltration. For the first few days after the operation the patient did very well. The pulse and temperature were both normal. A week after the stitches were removed, with the escape of a small amount of pus. The temperature was 100°, the pulse 104. There was also a slight cough, with rusty sputum. On physical examination, there was a hypostatic pneumonia at the base of the right lung. This condition passed off in the course of a day or two. The pulse still continued above 100, and slightly feeble. Whisky ℥ss. and digitalis ℥x. were administered every four hours, with marked improvement on the pulse. It became slower and stronger. On 21st January she was removed home, and could walk about and sit down with greater comfort. Her appetite improved, and she slept at night without any pain.

Recurrence.—Six weeks after the operation there was slight induration of the left labium majus, with involvement of the corresponding inguinal glands. On the inner surface of the left labium there was seen a small round ulcer the size of a sixpence. This caused very painful micturition, and was consequently removed, with the result that she could pass water without any pain. There was also recurrence in the wound in the right groin, in the form of two small nodules, which rapidly increased in size, ultimately coalesced and broke down, with considerable secretion of a bad-smelling dark-coloured fluid. An indurated mass could also be felt in the vicinity, adherent to the femoral artery and vein. There was slight œdema of the right leg. The disease advanced rapidly in the right groin, associated with great pain in the hip and knee joints, and considerable discharge of a large quantity of a thin serous fluid daily, at times blood-stained. Marked cachexia is now present, and she has lost considerably in weight. There is marked wasting of the muscles of the right thigh. To subdue the pain, she is constantly kept under the influence of morphia. Recently, marked improvement has taken place under the local action of the Röntgen rays. The pain is less severe, and the discharge is diminished in quantity.

Dr Berry Hart said the condition was not common. It occurred in old women—those about 60 years of age and

over. The question of age in malignant tumours was of great interest; certain types of malignant disease tended to appear at certain ages. As a rule, these cases did not do well after operation.

Dr Haig Ferguson thanked Dr Callender for his paper. The disease at first did not indicate its epitheliomatous nature. He could not say whether the epitheliomatous condition had occurred as secondary to the pruritus vulvæ and eczematous condition present, or had been a primary condition from the first, but it had certainly grown very rapidly after the diagnosis had been made.

Professor Kynoch agreed that, in his experience, these cases did not do well after operation. In one case in which he had operated, the disease had recurred in two months, and the patient had died shortly afterwards.

Dr Ballantyne said that he had shown a specimen of the same disease some years ago to the Society, in a woman aged nearly 70. This patient had lived for five years afterwards, and then died of recurrence of the disease.

Dr Barbour Simpson related notes of a case of this disease that had occurred in Professor Simpson's practice—commencing in the clitoris, but in which there had been no enlargement of the inguinal glands. The disease had been freely removed, and it was now three years since the operation, and there had been no recurrence.

The President said they were much indebted to Dr Callender for bringing the subject before the Society. Dr Callender had said that the percentage of vulvar cancer was 1 per cent., but some writers said it was as much as 2·6 per cent. He narrated notes of a case of epithelioma of the clitoris in an old lady aged 75. He did not think it necessary to assume that the disease had been malignant from the commencement, but deemed it quite possible that an eczema had been the source of the irritation, producing malignant disease.

Dr Callender, in reply, thanked the Society for the way in which they had received the paper, and mentioned that recently the patient had been subjected to X-ray treatment, and that the discharge had ceased, and the patient was looking distinctly better.

VI. REPEATED OVARIOTOMY.

By J. A. C. KYNOCH, M.B., F.R.C.P. (Ed.), Professor of Midwifery and Gynæcology, St Andrews University.

THE necessity for repeated ovariotomy in the same patient is somewhat rare. Of 228 cases of unilateral ovariotomy performed by Spencer Wells, recurrence in the presumably healthy ovary, necessitating a second operation, was noted in 6 cases; and of 300 cases collected by Pfannensteil in the Breslau Klinik, 6 required a second ovariotomy.

Vellitz has collected 135 cases of repeated laparotomies for various causes, and in 56 of those the indication was cystic disease of the ovary, which was apparently healthy at the first operation.

The interval between the two operations varies, according to Olshausen, from six months to twenty-five years. Most are reported to have taken place within two years; although a much longer period has elapsed in some cases before the second operation was performed. Doran reports two cases of repeated ovariotomy five and fourteen years after the first operation. Dr Croom recently reported before this Society a case where he removed a large dermoid cyst of the left ovary from a patient eighteen years of age. The right ovary, apparently healthy, was not removed. Eighteen months later, the patient was readmitted to hospital on account of recurrent abdominal swelling, which proved at a second operation to be due to a papillomatous tumour of the right ovary.

It is of importance, in considering the question of recurrent ovarian tumours, to exclude those cases where the second tumour had its origin from ovarian tissue left in the pedicle, or from part of the cyst having been left behind at the original incomplete operation. The mortality from the second operation is slightly higher than the first, probably because of greater frequency of adhesions. Olshausen gives the mortality at 12 per cent., whilst Vellitz finds the mortality from the second operation to be as high as 26 per cent.

Repeated ovariotomy raises the interesting question, What is to be done with the apparently healthy ovary in cases of operation for unilateral cystic disease?

Previous to the recent researches upon the pathology of papillomatous ovarian tumours, more especially by Pfannensteil and Williams, those cysts were regarded as forming one of the two great groups of ovarian cysts, and their exact clinical significance was a disputed question. Pfannensteil shows that papillomatous growths may be associated with perfectly simple ovarian cysts, causing implantation, metastasis on the peritoneum, with ascites, the latter being permanently cured in many cases on the removal of the tumour. On the other hand, of cystic carcinomas of the ovary, he finds one half papillary in nature, giving rise to true metastasis in the glands, liver, and other organs. It is, therefore, in the case of papillary cysts that the removal, partial or complete, of the other ovary is of most importance, because it is difficult or impossible during the course of an operation to say with any degree of certainty whether we are dealing with a simple or malignant papillomatous tumour. It is imperative for the operator to inform the patient before operation that the other ovary may at the same time have to be removed. This is specially necessary with patients at the child-bearing period. In women at or about the climacteric, it would probably be a safe rule to remove the unaffected ovary in every case. In younger patients, we have to consider the relative advantages of leaving the ovary, removing it altogether, or partially excising it. By leaving the ovary, the absence of the distressing symptoms associated with an artificial menopause, and the possibility of subsequent pregnancy taking place, have to be contrasted with the slight risk which the patient runs of a repeated ovariotomy. According to the statistics of Spencer Wells, only in 2·6 per cent. of unilateral ovariotomies is the repeated operation necessary. Of 228 ovariotomies performed by him, 120 of the patients subsequently bore children, and only in 6 cases, as already mentioned, was a second ovariotomy called for. If our patients could be kept under observation after operation, so that early manifestations of recurrence could be detected, there would not be the same danger in

leaving the unaffected ovary. But in the case more especially of papillomatous tumours, the recurrent growth spreads so rapidly, that by the time the patients come under observation operation is useless. Veit has reported such a case, where a papillomatous ovarian tumour was removed; nine months later recurrence took place in the opposite ovary, necessitating a second difficult operation. When the ovary shows incipient cystic disease, simple puncture with the knife or cautery, as first performed by Spencer Wells, and later by Schroeder and Martin, may be sufficient. Of 10 cases of incipient cystic disease so treated by Martin during the course of a unilateral ovariotomy, three of the patients subsequently became pregnant, and in no case was a second operation required for recurrent cystic disease. In small adenomatous and dermoid cysts, resection of the ovary has the advantage in younger patients of probably removing the disease, and at the same time leaving sufficient ovarian tissue to permit of ovulation and subsequent pregnancy. Mathai reports, from Olshausen's Klinik, 6 cases of pregnancy following partial resection of dermoid cysts. Mere resection of a papillary cyst is not so safe. Odehman recently published a case where a large papillomatous cyst was removed from the left side. The right ovary showed incipient papillomatous disease, and was only resected. The disease recurred in this ovary, and when the patient came under observation complete removal of the affected parts was impossible. Pfannensteil, writing on this subject, states, that in all cases of ovarian tumours which have a tendency to become bilateral, for example, carcinoma, sarcoma, and papillomatous tumours, the other ovary must be removed at the same time, and in all forms of tumours in patients over forty years of age.

The three following cases are of collective interest, from the fact that in each, within a period of two and a half years, a second ovariotomy was necessary for the removal of a cystic swelling of the ovary, which at the time of the first operation was apparently sufficiently healthy to warrant its being left behind. Individually they are of interest as illustrating recurrence in each case of a different type of tumour.

CASE I.—Mrs J., æt. 40, came under my care in the

summer of 1898, complaining of pain and abdominal swelling of four months' duration. She had been married twenty-one years, never pregnant, menstruation regular. On examination, there was dulness on percussion over the left lower quadrant of the abdomen, reaching as high as the umbilicus. The uterus was small and retroverted. Diagnosis was left-sided ovarian cyst. Ovariotomy being performed, the tumour proved to be a left-sided multilocular cyst. The pedicle was a long one, and was ligatured in the usual way. Beyond some few adhesions to the abdominal wall, the operation was uncomplicated. The right ovary was felt but not specially inspected, and, as it did not appear to be enlarged, it was not removed. Her recovery was satisfactory. She enjoyed excellent health for the following two years, but again consulted me on the 5th December 1900, two years and a half after operation. She now complained of pain and swelling on the right side of the abdomen, gradually increasing for some months previous to being seen. She had a ventral hernia, for which she was chloroformed with a view of curing it, when a swelling the size of a cocoa-nut was felt to the right of the uterus. This proved to be a simple multilocular ovarian cyst connected with the right ovary. There were no adhesions, the pedicle was secured in the usual way, and the abdominal wound sutured for the relief of the hernia. Two days after operation her temperature rose to 101°·8, pulse 124. She complained of pain in the back and over the right scapula, with rapid and painful breathing, and blood-tinged sputum. There was dulness over the lower half of the right chest behind. Ten days later the temperature and pulse were normal, and the pneumonic symptoms had subsided. After that she made an uneventful recovery, and was dismissed cured one month after admission to hospital.

CASE II.—Mrs R., æt. 34, consulted me in July 1899, on account of pain and swelling of the left side of the abdomen of two months' duration. She considered herself four months pregnant. The pain over the swelling was very severe, and continuous for a fortnight before her admission to hospital. Her previous health had been good, and she had had three natural full-time confinements. On examination, there was

felt a cystic swelling the size of a football, and extremely tender to pressure. To the right of the tumour, and reaching as high as a hand's-breadth above the symphysis, there was felt a soft swelling, corresponding in size to a four and a half months' pregnant uterus. The diagnosis was four and a half months' pregnancy, complicated with an ovarian cyst. On the 20th July ovariotomy was performed. The tumour was found to be a left-sided ovarian cyst, chiefly unilocular, and covered upon its inner walls with abundant papillary growths. There was some localised peritonitis over the tumour, which probably accounted for the pain complained of previous to operation. The pedicle, which was twisted, was ligatured in the usual way; and as the right ovary appeared to be perfectly normal, it was not removed. On the 19th of August she was dismissed well. She continued in good health, and had a normal confinement on the 22nd December, forceps being applied at the outlet. She nursed for a few weeks only, and menstruation was subsequently somewhat irregular. On 15th October 1900, fifteen months after operation, she was readmitted on account of dysuria of five weeks' duration. On examination, the abdominal cicatrix retained its dark pigmentation acquired during the later months of pregnancy. The uterus was normal in size, and was pushed to the front and left side by a cystic swelling the size of a child's head, occupying the right and posterior fornix. Diagnosis was ovarian cyst of the right ovary. On 18th of October vaginal ovariotomy was performed, and a unilocular papillomatous cyst was removed. The vaginal route was chosen in this case in preference to a repeated abdominal section, on account of the position, size, and mobility of the tumour. She was dismissed well on the 7th of November.

CASE III.—J. A., æt. 32, was admitted to hospital on 16th March 1900, complaining of swelling of abdomen of five months' duration. Menstruation regular; never pregnant. On examination, the abdomen was found occupied by a tense cystic swelling, corresponding in size to a full-time pregnancy. *Per vaginam*, no bulging was found in either lateral fornix, but the lower edge of the tumour could be felt through the anterior fornix on pushing it from above. On the 26th of March ovariotomy

was performed for a tumour having all the appearances of a simple multilocular ovarian cyst. The pedicle was secured in the usual way, and as there were universal adhesions to the peritoneum, the abdominal cavity was irrigated with sterilised water. The right ovary appeared to be unaffected. On the 1st of April there were noted signs of pleurisy with effusion over the base of the left chest behind. The chest signs cleared up in the course of a fortnight, and the subsequent progress of the patient was quite satisfactory. She enjoyed good health, and was able to attend her work in a mill for a continuous period of nine months. She was readmitted to my ward on 20th November of last year (a year and nine months after the first operation), complaining of abdominal swelling of two and a half months' duration, the increase being specially marked during three weeks previous to admission. Menstruation had been irregular since the first operation. On examination, the patient was found anæmic and somewhat emaciated; temperature 101°, pulse 120. There was found a semi-cystic abdominal swelling, nodular in parts, and rising in the middle line as high as a hand's-breadth above the umbilicus. There was complete dulness in both iliac regions, and great pain complained of in palpating the tumour. The uterus was retroverted, the sound passed half an inch beyond the normal, and through the anterior fornix the lower edge of the tumour could be felt. The circumference at the umbilicus was 36½ inches. The chest appeared to be normal, and the urine was free of albumen. Diagnosis was right-sided ovarian tumour, probably malignant. On the 26th of November ovariotomy was performed, and there was found a large quantity of blood-tinged ascitic fluid in the abdomen; the soft friable tumour, somewhat adherent posteriorly, was removed through a long abdominal incision. There was no trace of the left ovary. There was felt a nodule the size of a walnut upon the parietal peritoneum, and two smaller ones on the fundus of the uterus. The patient made a perfectly satisfactory recovery from the operation, but the abdominal pain complained of before operation continued uninterruptedly. This was referred chiefly to the peritoneal growth, which increased rapidly in size. A month after operation she had continuous sickness and vomiting, and she died with

all the symptoms of peritoneal cancer two months later. No post-mortem was obtained.

Of the three cases which I have reported, the first may be looked upon as a coincidence, both tumours being multilocular and simple in nature. Incipient cystic disease may have been present in the ovary which was left at the first operation, where simple puncture might have prevented further growth; but, from the age of the patient, its complete removal would I think have been justifiable. The second case favours Pfannenstiel's suggestion, that in all papillomatous ovarian cysts, irrespective of the age of the patient, the other ovary should be removed although apparently unaffected, on account of the suspicious nature of those tumours, and their great tendency to bilateral growth. The third case is of special interest over and above the other two, because of its bearing on the subject of the relation of proliferating cystomata of the ovary with cancerous disease of other abdominal organs. In the *Edinburgh Hospital Reports*, 1892, Professor Simpson, writing upon this subject, reports a case of double ovariotomy for simple multilocular cystomata, associated with carcinoma of the liver. He refers to the statistics of Spencer Wells, who found that of 1000 ovariotomies where 117 of the patients had died after recovery from the operation, 32 succumbed to malignant disease at an interval of from six weeks to five years after operation. Various explanations have been suggested to account for the greater tendency such patients have to become the subject of malignant disease. Professor Simpson drew attention to the greater liability to subsequent cancer after double as contrasted with unilateral ovariotomy, and from this fact he suggests that some cases might be accounted for by the absence of healthy ovarian products in the system, or to the presence of morbid products entering the circulation from the degenerated organs. Olshausen gives two alternatives for this tendency, "Either," he says, "we have to do in the affected cases with a mixed tumour (there being carcinomatous parts present in what appears to be a simple proliferating cyst), or the ovarian tumour was only a myxoid cystoma, but its extirpation gave rise to the carcinoma, from some of the epithelial cells of the adenoma having been allowed to remain

or fall into the peritoneal cavity. In the latter case these epithelial elements took root in the peritoneum, and were there nourished and developed into carcinomata."

Pfannensteil believes that many cases of carcinoma of abdominal organs following on the removal of ovarian tumours are independent of such growth, and are to be accounted for rather by a pre-existing cancerous diathesis. As illustrating this, he describes two cases, one where carcinoma of both breasts developed five years after simple lateral ovariotomy, and one of carcinoma of the stomach, occurring a year and four months after the removal of a double papillomatous ovarian tumour.

In the case I report, the first tumour which was removed appeared to be an ordinary multilocular ovarian cystoma, and in the absence of any suspicion of malignant disease in the abdomen it was not examined microscopically, nevertheless it may have contained malignant elements. The cyst, which was removed a year and nine months later from the other ovary, had also the appearance of a multilocular ovarian cystoma, and microscopic examination of it by Professor Sutherland failed to reveal any cancerous appearances.

Associated with this there were, however, cancerous nodules on the parietal and visceral peritoneum. The origin of these may have been undetected carcinomatous elements in the first tumour removed; or the case may support the suggestion of Professor Simpson, that the absence of ovarian products is an element of importance in the causation of abdominal cancer after double ovariotomy.

References.

Veit's Handbuch der Gynäkologie, vol. ii.; *Zeitschrift für Gynäk.*, vol. xxx.; *Lancet*, 1894, vol. ii.; *Edin. Obst. Transact.*, vol. xxv.; *Klinische Vorträge*, vol. iv., 1886; *Zeitschrift für Gynäk.*, vol. xxviii.; *Edin. Hosp. Report*, 1892.

Dr Berry Hart said it was a very interesting subject, and one in which much clinical work was yet required to be done. He himself had seen two cases requiring a second operation. In an ovarian cystoma it was not right to remove the other ovary,

but in papilloma it might be correct treatment to remove the second ovary at the same time, though it must be remembered that some of these papillomatous tumours were simple.

Dr Haultain thanked Professor Kynoch for his paper. He believed the subject had not been brought before the Society on any previous occasion. It was merely a matter of collecting clinical material in order to be able to come to a right conclusion as to the correct method of treatment. In his own experience he had performed 145 ovariotomies—13 double (a tumour on both sides), 1 dermoid bilateral, 18 papillary (and of these 8 were double), simple ovarian 107, 4 bilateral. There was a very great tendency for papillary tumours to be bilateral, and of the 15 cases in which he had removed the other ovary, 7 of these had been in cases of papillary tumour, as he always now removed the other ovary in these cases. Of the other 8 cases in which he had removed the second ovary, they were in cases where the second ovary appeared distinctly suspicious, and in which the tumour had been of the ordinary cystic type. Of these 8 cases, 6 were under thirty years of age, and he thought there was a greater tendency in younger people for the second ovary to also undergo cystic degeneration. With regard to the question of secondary operation, on three occasions he had opened a second time to remove a tumour:—(1) To remove a papillary cyst two years after removing a similar tumour. The patient died about four months after with an ascitic condition, probably from secondary peritoneal growth. (2) For a simple ovarian cyst occurring in an ovary which at time of first operation was considered healthy. (3) In a case in which he had previously removed a simple ovarian cyst, and in which on opening the abdomen he found the other ovary quite healthy, but that a condition of myxoma peritonei was present which was undoubtedly of a cancerous nature, and arose in connection with small cysts with extremely viscid gelatinous contents—cases that to his mind were malignant adenomata. In tumours in which the fluid did not easily flow out, he always now removed as if they were solid tumours, enlarging the incision to the necessary extent, considering it was safer to do this than to run the risk of infecting the peritoneum with what might prove to be malignant disease.

Dr Haig Ferguson wished to add his quota of thanks for the interesting paper. In his own experience, he had reopened the abdomen on three occasions:—(1) A patient, from whom a simple ovarian tumour had previously been removed, came in with another tumour, which turned out to be a simple ovarian, complicated by the presence of a large pyo-salpinx. (2) In a case in which a tumour had been removed five years before. The second tumour turned out to be a papilloma burrowing between the layers of the broad ligament. (3) A case in which a double oöphorectomy had been performed five years before, and in whom, on reopening the abdomen, he had found and removed a single myxoma of the broad ligament.

Dr Ballantyne said he had had no personal experience in this matter. But it seemed to him that in future it would not be sufficient to obtain permission to remove the second ovary if it were diseased, but that they should obtain permission to remove the second ovary if the condition of the diseased ovary was such as to give rise to the probability of the same disease occurring in the second ovary.

Professor Kynoch, in reply, thanked the Fellows who had taken part in the discussion. He considered that Dr Haultain's cases showed very clearly the great tendency of papillomatous tumours to be bilateral, and the advisability in these cases of removing the other ovary.

VII. ON THE USE AND ABUSE OF FORCEPS IN GENERAL PRACTICE.

By Michael Dewar, M.D., C.M.

It is reported that an eminent gynæcologist used to say, that at one period of his life he used to support the perineum, whereas now the perineum supported him. Another equally distinguished gynæcologist sometime ago remarked, that were it not for forceps, there would soon be very little for gynæcologists to do. There may be some little truth in both these sayings, but there is evidently a good deal of exaggeration. The inference to be drawn from these statements and the

like is, that forceps are very often unnecessarily and unskilfully used, or, in other words, their use is abused, and thereby the cases of perineal rupture, split cervices, recto- and vesico-vaginal fistulæ and other injuries which fall into the hands of the gynæcologist are produced. Any reference to this subject after the discussion by Sinclair, of Manchester, at Montreal in 1897, and that initiated by Milne Murray at Edinburgh in 1898, must be very stale to most of the Fellows; but as most of the speaking on these occasions came from men who are engaged in hospital and high-class practice, it occurred to me that it might be of some advantage to give the general practitioner's point of view—the standpoint of those who are mostly engaged with a respectable working-class practice. In these discussions of 1897 and 1898, there was a good deal of generalisations spoken regarding the great dangers attending the use of forceps to both mother and child, but very few facts showing the actual amount or percentage of injuries said to be due to the use of forceps. It is all very well for a gynæcologist to say that a large number of uterine, vaginal and perineal injuries are received into his practice to repair; but, when talking of the apparently large number of such cases, does he take into account the real percentage of the cases, and how many were due to forceps, and how many occurred without their aid? I quite admit that gynæcologists have some, perhaps a great number of cases, to repair. I do not know how many; but can the large majority of their injuries be properly attributed to the forceps themselves? Would it not be more correct to put the saddle on the right horse, and say that they are more likely due to the use of forceps in inexperienced hands?—and this brings us to the question of the efficiency of the practical obstetric curriculum for medical students. How many men go out into practice with a sound practical knowledge of the use of axis-traction forceps? How many have actually applied them in an occipito-posterior position, or even in an ordinary occipito-anterior position? How many of them have anything but a book knowledge of their use? Are young medical men to be blamed for a lack of such practical knowledge? Are they to be blamed or censured if, by an awkward application of the

forceps in a nervous or frightened woman, injuries are thereby caused? They must, if they cannot be properly educated in the use of forceps during their curriculum, learn somewhere, and so long as men are sent out into practice with a deficient or no practical knowledge at all of such an important operation, so long will gynæcologists have repairs to make. Most men, even after they have acquired some confidence and skill in the use of instruments, have occasionally a split cervix or ruptured perineum, but all whom I have questioned on the subject agree that a great many more cases occur in unaided than in aided cases. The peculiarity of obstetric practice is that every man must, or ought to be, an expert, thus differing from the sister branch of surgery, where, in nine cases out of ten, an expert can be called in. The obstetrician all over the country is frequently in an isolated position, and must do the work himself. Either there is often no time to send for an expert, or what is perhaps as important, the people concerned cannot afford it. Pregnancies come too often to the working-classes for such a luxury. Personally, after graduation, my great terror was midwifery in an isolated position. I had never used, nor seen used, forceps in an actual case in my midwifery curriculum, and, strange to say, my lot was first cast in a country district, and I had practically to learn alone all I know of the use of instruments in my private practice. It will thus be seen that if so many injuries occur after forceps as is said, the cause will be found, not in the proper use of the forceps themselves, but in the unskilful manner in which they are first used. To settle this point in a way, I would like to ask specialists, how many cases they get from juniors, and how many from seniors?

In the paper read by Dr Sinclair five years ago, he made a vigorous onslaught on the too great frequency with which forceps were used in obstetric practice, and condemned out and out their unnecessary use. I believe that he holds that 3 to 5 per cent. of forceps cases is quite high enough, and that anything above that is uncalled for. More recently this statement has been corroborated by obstetricians in various parts of the country. Others again, whose opinion is entitled to respect, admit that 12 to 15 per cent. would be a fair

average. In estimating at the present day what should be as near as possible a correct average of the percentage of forceps cases, so as to discriminate between what may be termed proper forceps cases and what may be termed improper, one has to take into consideration certain conditions:—

(1) As to whether the *locale* be city or country. Now, a good deal depends on this. In a city, the man in general practice has to contend very often with a class of patients, a large majority of whom are less or more anæmic, poorly developed in a physical sense, often having a conjugate slightly diminished—one though not reaching a diameter necessitating premature labour or Cæsarean section, yet sufficient to make a very long, difficult, and lingering labour.

(2) By intercommunication the city woman has learned to be less patient. She hears of her neighbours so constantly being relieved by means of chloroform and instruments, that these adjuvants have been completely shorn of their terrors, and eight out of ten demand help of this kind immediately on the arrival of the doctor. It is, of course, for the medical man to resist these importunities till a suitable time has arrived for their use. It is quite different in a higher class practice, where one has, in attendance on a woman who has been better educated and who has cultivated a little more self-control, a well-trained nurse in addition to one's self. The nurse, if wise and tactful, will be able to calm and alleviate the fears of such a woman—a marked contrast to the case of a working-man's wife, who has probably been working in a factory since she left school, and leading a very irresponsible life till marriage overtakes her, and in due course is being waited on by an equally ignorant and irresponsible neighbour or incompetent nurse. Again, this latter type of woman, on the other hand, who is being confined in a maternity hospital has, of course, the influence of discipline upon her, and necessarily has to wait till nature accomplishes the delivery, or till the obstetrician considers it time to interfere, thus accounting for the small percentage of forceps cases in hospital practice.

(3) In the country, especially in rural districts, you have a different type of woman altogether, and here the percentage

of forceps cases is very much smaller than in the city, as I will presently show. The majority of the women are of a more robust physique, and being accustomed to outdoor work are much better developed physically, and owing to their greater segregation, and living at long distances from medical men, are taught to endure pain of all kinds much more heroically, whereas a city woman will do nothing of the kind. Country women, owing to these facts, have, or at least used to have, in my experience, a perfect horror of the "Irons" as they are called, and would refuse their application when offered, and would not submit till they were convinced by their own feelings and exhaustion that something would have to be done to help nature. This fact is borne out by reference to the notes of my country practice, where I find that it was no uncommon thing having to wait for periods of twelve to forty-eight hours away up a glen 15 to 20 miles from home. In 1000 cases in my country practice, there were seven women with marked contracted conjugate. Of these, *one* was delivered three times by version, *two* twice by version, and *four* once by version and instrument. When I look back upon these first years of my practice I feel strongly that had I been possessed of the improved instruments of the present day, and the greater skill in their use which experience has given me, a great deal of unnecessary suffering on the part of the patient would have been saved on many occasions, without increasing the mortality or morbidity.

(4) Another factor which determines the more frequent use of forceps in city practice, one which is rather more rare in country practice, is diminished "vis a tergo," or inertia. That is a condition which, if unduly prolonged, to my mind demands instrumental help.

I know that there are some who deprecate the use of forceps in such cases, mainly on the ground of the risk of post-partum hæmorrhage, but my experience in dealing with these is of the very opposite nature. I have never had post-partum hæmorrhage when I applied forceps in inertia cases; in fact my record is clean as regards this accident after all my instrument cases. The only occasions in which such a casualty occurred were unaided ones.

STATISTICS.

In approaching this, the most important part of my paper, since it deals with facts, I have to thank the various gentlemen who so kindly furnished me with details of their practice, so far as they could. It is not the general rule for medical men to keep an accurate account of their midwifery cases, and I can sympathise with them, for it is a somewhat laborious task in a busy practice, unless the habit is acquired at the very beginning of professional life. In hospital practice the percentage of forceps cases is exceedingly small. Thirty years ago, I believe, the percentage of such cases in the Edinburgh Maternity Hospital was ·21, while the maternal death-rate was ·8. In the Dresden Hospital from 1883-88 the percentage was 2·8, while in the year 1887 alone it was 1·9, and in 1888 1·8, while the maternal mortality was in forceps cases 3·4 per cent., and the infantile mortality 17 per cent. In the days of Churchill, forceps were used by British practitioners 1 in 249 cases = ·4 per cent., with a maternal mortality of 5 per cent., and infantile mortality of 21 per cent. In Germany and France the percentage was ·9 and ·7 respectively, with a maternal mortality of 3 per cent., and infantile mortality of 17 per cent. Coming to the present time, several obstetricians maintain that forceps cases should never exceed 5 per cent., while others allow a limit as high as 20 per cent. This percentage of 5 per cent. may be quite correct and proper under the conditions already alluded to, but I affirm that it is impossible to carry on a general working-class practice with anything near this percentage. I have obtained statistics from various men in town and country, and not one of these come any way near 5 per cent.

In giving my own statistics, I may premise that part of my practice was carried on in a small town with a large and wide agricultural district in Forfarshire, and the other part in Edinburgh. For the purpose of comparison, I have taken the first five years (out of eight) of my practice in the country, and the last five years (out of seventeen) of my practice in the city. In the country I used Simpson's long forceps, had

no great experience or skill for sometime in their use, and was often obliged to wait on for hours, and sometimes days, owing to the repugnance of the women to their use. In the city I have used axis-traction forceps, have, of course, more skill in their use, and have had to contend with the all-absorbing desire for relief on the part of the parturients, which I have already pointed out.

In Edinburgh Maternity Hospital, out of 300 cases there were 32 forceps cases = 10·6 per cent., with a maternal mortality of 1·3 per cent., and infantile mortality of 4 per cent.; while in the extern practice, out of 536 cases there were 23 forceps cases = 4·3 per cent., with a maternal mortality of ·4 per cent., and an infantile and fœtal mortality of 11 per cent.

In 700 cases in the country from 1877 to 1881, forceps were used 77 times = 11 per cent., as follows:—R.O.P., 38; L.O.P., 8; L.O.A., 14; R.O.A., 16; and Face, 1. Version was employed 8 times—R.O.P., 4; L.O.P., 2; Face, 2. If the version cases, in which I failed with instruments, were added to the forceps cases, the gross percentage would be 12·1. Of primiparæ in this series the percentage was 20; and of secundiparæ 22·6.

Through the courtesy of several medical men in the country, I have received the following percentages:—Dr C., 10 per cent.; Dr G., 12·5 per cent.; Dr R., 13 per cent.; Dr K., 30 per cent.; Dr Y., 10 per cent.

These percentages are very similar to my own, and, I think, may be taken as a fair average of careful midwifery in the country.

In my second series of 300 cases from April 1896 to April 1901, forceps were used 105 times = 35 per cent., as follows:—R.O.P., 21; L.O.P., 10; L.O.A., 63; R.O.A., 11. The very large increase of L.O.A. instrument cases in this series may be noted as compared with the first series, the increase being amongst the primiparæ. Version was employed in 3 cases—Face 2 (in one of which forceps were used after version), and Transverse presentation 1. These added to the forceps cases brings up the rate to 36 per cent. The following are the percentages of a few men in the city:—Dr M., 10 per cent., used to be 20 per cent. a few years ago; Dr S., 35 per cent.;

Dr M'L., 38 per cent.; Dr P., 39 per cent.; Dr B., 40 per cent.; Dr C., 45 per cent. Here again there is a marked similarity in the percentages of town practice.

Before dismissing the percentage question, I may say that, in common with those medical men who have kindly furnished me with their statistics, I almost never use instruments, unless the condition of the mother or child indicate their use, and never unless the os is fully dilated, or easily dilatable, with one exception perhaps, namely, the onset of convulsions or other dangerous complication.

Coming to the mortality, amongst the country men Dr R., with 13 per cent. of forceps cases, had out of 249 cases with 32 forceps, 2 deaths after forceps = 6 per cent. of the forceps cases, or ·8 of the whole.

Dr Y., with 10 per cent. of forceps cases, had out of 454 cases with 45 forceps *no* deaths after forceps, and 1 death in an unaided case of acute peritonitis on the fifth day = maternal mortality of ·2 of the whole. *No infantile mortality after forceps.* The others did not give me details of their mortality.

In my first series of 700 country cases there were *no* deaths after forceps, but there were 4 deaths = ·57 of the whole—one after version, where, in a R.O.P. position with contracted conjugate, the child was stillborn, and the mother died on the fifth day of puerperal fever. The other 3 deaths were simple L.O.A. positions, delivered naturally and easily—1, a primipara, of puerperal fever on the fourth day; 1, a multipara, of pneumonia on the third day; and 1, a multipara, of puerperal fever on the fourth day.

As regards the children in this series, there were 20 deaths = 2·8 per cent. of the whole. Six were forceps cases = 7·7 per cent. of the total forceps cases, and ·85 of the whole; 4 were in contracted pelves, of which 1 was a face, and 1 a prolapsus funis; and 2 in ordinary pelves, of which 1 was a prolapsus funis, and 1 a R.O.P. Four were version cases = 50 per cent. of 8 version cases, and ·57 of the whole; 3 R.O.P.'s in contracted pelves, and 1 R.O.P. in ordinary pelvis. Ten were unaided cases—2 R.O.P., 1 L.O.P., 3 L.O.P., 2 Breech, and 2 no note of position, being born before arrival.

Then, amongst the city men, Dr M., with 10 per cent. of forceps cases had 2 per cent. maternal mortality; Dr S., with 35 per cent. in 350 cases, had *no* maternal mortality, and ·05 per cent. infantile mortality; Dr P., with 39 per cent. in 548 cases had no maternal mortality; Dr B., with 40 per cent. in 300 cases, no maternal mortality, and ·3 per cent. infantile mortality; Dr M'L., with 38 per cent., no maternal mortality.

In my own series of 300 city cases,[1] there was 1 death, but this misfortune was neither due to forceps, version, nor septic fever. It was a breech case in an elderly primipara, who suffered from heart disease (mitral and aortic incompetence), and was so breathless that she was unable to lie down in bed. The moment the head was extracted, she suddenly died.

There were 5 deaths[2] amongst the children = 1·6 per cent. —1 after version transverse, 1 breech, 1 of a twin, 1 L.O.P. with instruments, and 1 L.O.A. and prolapsus funis with instruments. In stating the infantile mortality, I have not included in either series the non-viable children, *i.e.*, up to six months.

Morbidity.—As regards the morbidity, I am sorry I neglected taking full notes in the early series, except of the more serious casualties. In the 77 forceps cases and 8 version cases, there were 8 ruptured perineums, 6 of which were stitched, while 12 occurred in unaided cases, especially in occipito-posterior position. The majority of these latter were more severe than in aided cases, requiring more stitches. Of split cervices, there were 2 in primiparæ, 1 in a version case, the other with instruments. In both cases the split was almost confined to the os, and gave rise to no inconvenience afterwards, and both bore children again in due time. It was in unaided cases that there was most trouble. There were 2 post-partum hæmorrhages in multiparæ, 1 puerperal insanity in a multipara, 1 catalepsy in a primipara, 1 phlegmasia dolens in a primipara, 1 smallpox in a secundipara, all of whom made good recoveries. There was no post-partum hæmorrhage after instruments or version.

In the second series of 300, the most serious morbidity

[1] 0 per cent. after forceps; ·3 per cent. of the whole.

[2] 1·9 per cent. of forceps cases; ·6 per cent. of the whole.

occurred in the unaided cases. In the 108 forceps and version cases (105 and 3) there were 3 cases which required stitching. One of these occurred in my absence on holiday, and was so severe as to necessitate a repair afterwards. When my substitute was in the act of inserting the upper or right blade, the patient, who was only partially anæsthetised, gave a jump forwards, with the result that the blade passed right through the perineum, tearing into the bowel. With this exception, the most severe perineal ruptures occurred in unaided cases, 14 in number, some 6 or 7 when I was present, the rest when no one was there but the nurse. Many a perineum is ruptured badly by inexperienced nurses, in the absence of the medical man, urging the poor woman to bear down with all her might when the head is on the perineum, when a little judicious pressing back of the head at that stage would avoid at least a bad rupture. However, we all know that some perineums go like wet paper, in spite of all precautions.

Here again I had most trouble with the unaided cases—1 primipara was removed to the asylum on the tenth day, 4 post-partum hæmorrhages, 2 suppurating breasts, 1 split cervix, 1 phlegmasia dolens, 1 which required the catheter, and was not convalescent till the forty-third day, and 2 very bad ruptured perineums.

Regarding the period of time till these 300 cases were convalescent, I find that the instrumental cases compare very favourably with the non-instrumental. Of the 105 forceps cases, 81 were convalescent in from 8 to 14 days, and 24 in from 15 to 30 days. Three version cases were convalescent in 10, 12, and 22 days. Of the 192 unaided cases, 163 recovered in 8 to 14 days, and 29 in 15 to 43 days, so that the average of forceps was 11 and 22½ days = 77 per cent. in 11 days, and 23 per cent. in 22½ days; unaided, 11 and 29 days = 84 per cent. in 11 days, and 16 per cent. in 29 days.

In conclusion, I think it will be admitted that these figures conclusively show that the record of the 300 cases, with a forceps percentage of 35, a ·3 maternal mortality, though practically it was a clean slate (the one death being unavoidable), and a 1·6 infantile mortality, is a much better one than

that of the 700 cases with a forceps percentage of 11, a ·57 maternal mortality, and a 2·8 infantile mortality. It is also infinitely better than that of hospitals in the past, and compares favourably with the record of hospitals at the present day, where it is presumed that everything in the way of sanitary precaution is taken as regards the building, and antiseptic methods are carefully carried out in the routine practice. As regards my own routine, I simply wash my hands and nails thoroughly in soap and water, use corrosive vaseline as an unguent, make as few P.V.'s as possible, and always have my forceps in good order. I do not boil them, however, each time; neither do I swab the vagina, nor yet do I make a routine practice of douching, unless I have a very good and capable nurse. My plan is as simple as possible, and the results are as good as most, and better than some.

In contradistinction to the opportunities for getting good results in hospitals, the man in general practice has to contend with ignorance, dirt of all kinds, incompetent attendants: insanitary visitors, who often change napkins and do other little offices for the patient; careless dieting, often in direct opposition to what is ordered; the inlying room often the kitchen; the inlying often taking place in houses where eruptive fevers have been nursed, and nothing done to clean the walls and bedclosets, of which there are too many in Edinburgh, beyond a little sulphur fumigation; inlying women worried with the cares of large families, and often only attended by a neighbour, and thus frequently left after the first day or two very much to their own resources. I have even known women rising to answer the door on the second day, and yet the mortality and morbidity is extremely small. It is a perfect wonder how some recover at all.

In considering the statistics of general practice, the lesson to be learned is, that there is much greater safety to both mother and child by a liberal, judicious, and careful use of the forceps than where the labours are allowed to linger on, by the instruments being withheld for a long time or not used at all, till the woman is quite exhausted, and her vital powers of resistance so lowered that she becomes extremely

susceptible to the influence of disease germs, which are ever ready to take the upper hand. One cannot forget the record of Hamilton, of Falkirk, who delivered successively 700 cases with forceps with no infantile mortality. This is a record, however, not to be emulated.

I do not believe that any medical man willingly uses forceps to save more time, and this belief is corroborated by many men in large practice, who have written to me in such words as: "I never use instruments if the case is progressing favourably though slowly, and only when it is evident that nature is unable to accomplish delivery with safety to mother and child."

Analysis of 700 Cases, 1877-1881.

FORCEPS.

R.O.P.	L.O.P.	L.O.A.	R.O.A.	Face.	Breech.	Maternal Mortality.	Infantile Mortality.	Twins.
38	9	14	16	8	10	4	20	12
11 Multi., *m.*	6 Multi., *m.*	1 Multi., *m.*	8 Multi., *m.*	1 Multi., *m.*, version; living.	4 Multi., *m.*	= ·5 per cent.	= 2·8 per cent.	12 Multi.
6 ,, *f.*	1 ,, *f.*	4 ,, *f.*	4 ,, *f.*	1 Secundi., *m.*, instru.; living.	2 ,, *f.*	3 Unaided.	6 Forceps.	(6 both cranial; 6 cranium and breech).
2 Secundi., *m.*	1 Primi., *m.*	1 Secundi., *m.*	1 Secundi., *f.*		2 Secundi., *m.*	1 Version.	4 Version.	
2 ,, *f.*	1 ,, *f.*	7 Primi., *m.*	5 Primi., *m.*		2 Primi., *m.*		10 Unaided.	
14 Primi., *m.*		1 ,, *f.*	3 ,, *f.*	1 Secundi., *m.*, version; st. b. c. c.	(1 Primi.; instrument for head).			
3 ,, *f.*								

UNAIDED.				GRAVE MORBIDITY.	
44	5	541*	20		
9 Multi., *m.*	3 Multi., *m.*	179 Multi., *m.*	5 Multi., *m.*	1 Multi., *m.*	Post-partum hæmorrhage; recovered.
19 ,, *f.*	1 ,, *f.*	171 ,, *f.*	4 ,, *f.*	1 Primi.	Puerperal fever; died fourth day.
1 Secundi., *m.*	1 Primi., *m.*	32 Secundi., *m.*	2 Secundi., *m.*	1 Multi.	Insanity; recovered.
1 ,, *f.*		35 ,, *f.*	2 ,, *f.*	1 Secundi.	Smallpox; recovered.
7 Primi., *m.*		64 Primi., *m.*	2 Primi., *m.*	1 Multi.	Pneumonia; died third day.
7 ,, *f.*		60 ,, *f.*	5 ,, *f.*	1 Multi.	Puerperal fever; died fourth day.
		*The above number includes undiagnosed cases.		1 Multi.	Post-partum hæmorrhage; recovered.
				1 Primi.	Catalepsy; recovered.
				All in unaided cases except 1 version.	
				No grave morbidity in forceps cases.	
				No mortality in forceps cases.	

Analysis of 300 Cases, April 1896 to April 1901.

FORCEPS.

R.O.P.	L.O.P.	L.O.A.	R.O.A.	Face.	Breech.	Transverse.	Maternal Mortality.	Infantile Mortality.	Twins.
21 5 Multi., *m.* 5 ,, *f.* 1 Secundi., *m.* 1 ,, *f.* 7 Primi., *m.* 2 ,, *f.* *Convalescence.* 13 in 8 to 14 days. 8 in 15 to 30 days.	10 1 Multi., *m.* 1 ,, *f.* 1 Secundi., *m.* 3 ,, *f.* 1 Primi., *m.* 3 ,, *f.* *Convalescence.* 8 in 8 to 14 days. 2 in 15 to 17 days.	63 9 Multi., *m.* 18 ,, *f.* 6 Secundi., *m.* 5 ,, *f.* 15 Primi., *m.* 15 ,, *f.* *Convalescence.* 54 in 8 to 14 days. 9 in 15 to 30 days.	11 4 Multi., *m.* 1 ,, *f.* 4 Primi., *m.* 2 ,, *f.* *Convalescence.* 6 in 8 to 14 days. 5 in 15 to 27 days.	2 1 Multi., *m.*, version and forceps. Convalescence, 10 days. 1 Secundi., *f.*, version. *Convalescence.* 12 days.	9 2 Multi., *m.* 2 ,, *f.* 1 Secundi., *m.* 1 ,, *f.* 2 Primi., *m.* 1 ,, *f.* *Convalescence.* 10 to 20 days.	1 Secundi., *f.*, version; still-born. *Convalescence.* 22 days.	1 = ·3 per cent. Heart disease.	5 = 1·6 per cent. 1 Version. 1 Breech. 1 (of twins). 1 Forceps. 1 Forceps, with prolapsus funis.	4 1 Cranium. 3 Cranium & breech.

UNAIDED.				GRAVE MORBIDITY.
1 Secundi., *f.* *Convalescence.* 28 days.	2 1 Multi., *m.* 1 ,, *f.* *Convalescence.* 7 and 10 days.	173 86 Multi., *m.* 49 ,, *f.* 16 Secundi., *m.* 20 ,, *f.* 22 Primi., *m.* 15 ,, *f.* 15 Undiagnosed *Convalescence.* 134 in 8 to 14 days. 24 in 15 to 43 days.	7 2 Multi., *m.* 3 ,, *f.* 1 Secundi., *m.* 1 Primi., *f.* *Convalescence.* 5 in 10 to 12 days. 2 in 21 to 35 days.	1 Primipara, insanity; recovery. 4 Post-partum hæmorrhages, 11 to 26 days; recovery. 2 Suppurating breasts, 23 and 29 days; recovery. 1 Split cervix, 14 days; recovery, 1 Phlegmasia dolens, 33 days; recovery. 1 Catheterisation, 43 days; recovery. 2 Ruptured perineums, very bad; recovery. 12 Ruptured perineums, slight; recovery. } Unaided Cases. 3 Ruptured perineums *after forceps* (1 very bad, 2 slight); recovery.

Dr Berry Hart said it was very difficult to get students to apply themselves to obtain efficiency in midwifery practice. A great many entered the medical profession because of their love for surgery, and spent much time on surgery and in the surgical wards, not realising that they would have very much more midwifery than surgery. As to the use of forceps, in multiparæ a time limit of two hours was excellent, but in primiparæ the question was much more difficult. He thought that they should not wait longer in the second stage than three and a half hours, for, in cases in the Maternity, he had noticed that in waiting four hours, usually about that time a little swelling of the perineum appeared, thus indicating the limit in primiparæ. He had also noticed that, in cases of rigidity of the tissues, there was a time when the perineum seemed to relax and soften, and regarded that as an indication of a safe time in which to apply forceps. He thought that students should be warned that the best cases for the use of forceps were in multiparæ, with the head low down, in the second stage; that they should be cautious with primiparæ, holding off in the first stage, and in the second stage remembering the time limit of three and a half to four hours, and also that they should be cautious in elderly primiparæ. In using forceps to bring the head over the perineum, he preferred the legs of the patients to be straight out, or right over the edge of the bed, and did not recommend the usual side position. He considered axis traction forceps was an admirable instrument, but thought that they were rather apt to have a higher infant mortality, for the forceps was too rigid an instrument, and the head was compressed; and if statistics were taken, he would not wonder if there was not a higher fœtal mortality than was usually imagined. He thought Dr Dewar's paper a very valuable one, and congratulated him upon his material and his style.

Dr Haultain said that certain broad principles ought to be laid down, especially for teaching purposes, on the indications for the use of forceps. The only possible way to do this was to give a time limit. The frequency of delayed labour was due most commonly to rigidity of soft parts, with, perhaps, a secondary inertia; and in giving students teaching as to the

indications for the use of forceps, he gave two hours as a limit in multipara, and three and a half hours in primipara. In carrying out this principle in his own private cases, he had looked up his last 50 cases, dividing them into multiparæ and primiparæ, and in the last 25 multiparæ he had used forceps thrice, in the last 25 primiparæ, 18 times.

Dr Keppie Paterson expressed his opinion that Dr Dewar's paper was a valuable addition to the *Transactions* from a practitioner's point of view. He had looked up his last 500 cases of midwifery in private practice, and found he had used forceps 74 times—about 15 per cent.—44 cases were of use of high forceps, 30 of low forceps—no maternal death. Of his high forceps cases, most were those in which there had been rigid os before the application of forceps. In these cases he never gave morphia or chloral, but tried digital dilatation. If this was found to be very painful, he gave chloroform, and then dilated freely with the finger. In some other cases in which the pains of the first stage had been specially acute, and in which the nervous system was worn out and inertia had set in before the commencement of the second stage, he had given chloroform, dilated the os, and put on forceps. The low forceps cases were mostly for inertia. In early practice he always waited three hours on the second stage, but now he applied them when inertia had supervened, sometimes in two hours, and occasionally when the second stage had lasted only a little over an hour. This percentage of 15 per cent. compared favourably with those Dr Dewar had mentioned, of 35 per cent. and over. The difference might be due to the management of the second stage; the large majority of women did not exert their abdominal muscles properly, and required some education in their use.

Dr Ballantyne asked Dr Dewar how he would propose to remedy the state of things in regard to the teaching of practical midwifery.

Professor Kynoch wished to corroborate what Drs Hart and Ballantyne had specially referred to as to the teaching of practical midwifery. In the Dundee Infirmary the Residents took a period in the maternity ward, and the ignorance shown by these gentlemen in practical obstetrics was appalling. It was

astonishing that practical surgery should be compulsory, whereas practical midwifery was not. On the Continent, he had specially noticed what importance was attached to the giving of practical work to students in contrast to theoretical teaching.

Dr Haig Ferguson agreed with Dr Haultain as to the need for dividing the cases into primiparæ and multiparæ. His own percentage in the case of forceps was much the same as Dr Haultain's. With regard to laying down a time limit in these cases, this would place all patients on the same level. In this connection he remembered the saying of Sir J. Simpson, that "One should wait to see what Nature could effect, not what it could endure," and he applied forceps when the patient's strength was becoming exhausted, and he used them in impending inertia rather than when it had developed. He did not agree with those who said, apply forceps as soon as the os is open and the membranes are ruptured, for in so doing they would not have the head moulding that was so often a distinct gain in using instruments at a later stage. They could not discuss Dr Dewar's paper very well, because it would be necessary to read it, rather than simply to hear it read; but they were deeply indebted to Dr Dewar for bringing this clamant question before the Society.

Dr Dewar, in reply, thanked the Fellows for their kind reception of the paper. He agreed with the teaching part of the profession as to the great difficulty of teaching students practical obstetrics, and said that many students went into practice without having put their hand to a single midwifery case. He considered that something should be done to make men show they had some practical knowledge of the use of forceps before they went into practice, and if that was not possible in the schools, then it should be made compulsory to take an assistantship before being permitted to go out into practice.

MEETING VIII.—JULY 9, 1902.

DR JAMES RITCHIE, *President, in the Chair.*

I. The following gentlemen were elected Honorary Fellows of the Society:—Professor Pestalozza, Florence; Professor H. J. Garrigues, New York.

II. The following gentleman was elected an Ordinary Fellow of the Society:—Dr J. W. Somerville, 12 Abbotsford Road, Galashiels.

III. HÆMORRHAGE DURING THE LATER MONTHS OF PREGNANCY AND EARLY STAGES OF LABOUR.

By ROBERT JARDINE, M.D., F.R.S.E., Senior Physician to the Glasgow Maternity Hospital.

BEFORE taking up the subject with which we are to deal to-day, I wish to tender to you my sincerest thanks for the honour you have done me in asking me to open the first conjoint discussion of our two Societies. We, the Fellows of the younger Society of the West, gladly avail ourselves of the opportunity of meeting you to-day, and we trust that alternate meetings may be arranged for in the future. Whatever jealousies may exist between the two cities, we are at one in our endeavour to advance scientific obstetrics, and nothing but good can come from an interchange of views.

Personally, I undertake my task with considerable diffidence when I remember that I am about to lay my views before men who, not so many years ago, taught me all that I knew about obstetrics when I passed from my studies in the University of Edinburgh into a wider field of experience in practice. Since then I have learned much, and have perhaps had to unlearn just a little of what was imparted to me in my student days. As a field for practical experience in obstetrics, there is no place in the United Kingdom that

can equal the Glasgow Maternity Hospital. As I have been fortunate in being on the staff for ten and a half years, five and a half of these as a full physician, my experience has been both wide and varied. In the past we have been hampered for want of room, and unable to properly utilise the material for teaching; but very soon this will be a thing of the past, and I look forward to seeing within a few years, a flourishing School of Obstetrics worthy of the second city of the Empire.

To deal adequately with the subject of hæmorrhage during the later months of pregnancy and early stages of labour would take up more time than I have at my disposal, so I shall try to make my remarks as brief as possible, and confine myself almost entirely to the practical question of treatment.

Unavoidable hæmorrhage which arises from the separation of an abnormally situated placenta, that is, one entirely or partly attached below the retraction ring, I shall first consider. It would be interesting to discuss the etiology of this condition, but time will not permit. As soon as dilatation begins separation must occur, and separation of the placenta means the opening up of sinuses and hæmorrhage. In the central variety the entire placenta must separate, and therefore the hæmorrhage will be very severe. In the lateral variety the greater portion of the placenta must separate and the hæmorrhage will be severe; while in the marginal variety, where only a small portion of the placenta is below Bandl's ring, the bleeding will not be great. This latter variety, I believe, exists much more frequently than is generally supposed, and it is the cause of the comparatively slight bleeding which not unfrequently occurs in the early stages of labour.

Treatment.—If the first attack of bleeding occurs before the fœtus has reached a viable age, I think one should try palliative measures unless the loss is very severe. Absolute rest in bed, with perhaps an opiate, and attention to the bowels and diet is all that is to be done; styptics are of no use. The patient and her friends must be warned that if bleeding recurs they must notify you as quickly as possible. Unfortunately, women are so accustomed to large losses of blood that they are not easily alarmed, and they may delay sending for you until it is too

late. I have known this happen more than once even after the patient and friends had been warned.

If the fœtus has reached a viable age and the bleeding is at all severe, prompt treatment should be adopted to check the hæmorrhage and get the uterus emptied.

To check hæmorrhage, the most efficient method is by means of plugs. If the os is not dilated at all, or only slightly dilated, the vagina should be firmly plugged after it has been carefully cleaned. The cervix should be plugged first, if it will allow of this. A properly inserted plug will control the hæmorrhage, but to be effectual it must be packed in so as completely to fill the vagina; Barnes' or Champetier de Ribes' bags may be used. The latter is a most effectual plug, but by the time the cervix is dilated sufficiently to insert it, you can make use of plugging from above by doing bipolar version and bringing down a leg. For controlling hæmorrhage the breech of the child is the best of all plugs, so that in all cases where there is sufficient dilatation of the cervix, the leg should be brought down after bipolar version in a head or transverse case, or hooking the leg down in a breech case. The vaginal plug not only controls the hæmorrhage but also assists dilatation. The plug should be removed in a few hours, and as a rule, the os will be found sufficiently dilated to allow of the bringing down of a leg. If it is not, the plugging may be renewed.

Once a leg is brought down, the hæmorrhage can be checked by keeping up gentle traction. It is now that a mistake is unfortunately sometimes made, especially when the child is alive. I am a firm believer in the rights of the unborn babe, but in a case of placenta prævia the mother's rights are paramount, and there must be no hastening of delivery in the interests of the child. In an ordinary case, under certain circumstances, the head may be dragged through a partially dilated cervix to save the child's life, but this should never be done in a case of placenta prævia. A torn cervix in an ordinary case can be dealt with without any particular risk to the patient, but in a case of placenta prævia the tear is sure to cause excessive hæmorrhage and probably death. Therefore, when the cervix is not dilated, to allow the head to pass without laceration you must wait patiently, keeping up gentle traction

on the leg and massaging the abdomen to stimulate uterine action.

In cases where the os is fully dilated, delivery should be effected at once by version or forceps. If it is a central form, the hand must either be passed through or round the edge of the placenta. Stripping off the placenta as far as one can reach is useful before turning, as it allows the cervix to dilate more easily, and the pressure of the breech will close the sinuses. In the marginal variety you may rupture the membranes in a head or breech presentation, and stimulate the uterus by friction. The pressure of the presenting part will stop the bleeding, and you may allow the labour to finish naturally.

When the child is born, if the placenta does not come away at once, it should be removed. I have several times found the upper part of it firmly adherent. If there is any post-partum bleeding, the best way to control it is by pressure. Ergotin should be given hypodermically. Pass the hand into the posterior fornix, then grasp the uterus through the abdominal wall with the other hand, and jam it between the two hands. A hot intra-uterine douche will do good by causing retraction of the upper part of the uterus, and thus lessening the blood supply to the lower uterine segment, but it may do harm by washing the clots out of the sinuses. A hot douche is usually given, but it has its drawbacks. I have seen profuse bleeding come on half an hour after delivery when a hot douche was given. There had been none from the time of delivery, and it began as soon as the douche was commenced. If there is any tendency to post-partum hæmorrhage I invariably plug the uterine cavity, cervix, and vagina. Of late I have been using a douche of 30 grains of suprarenal gland to the pint, and it seems to have a good effect in post-partum hæmorrhage.

Before I pass from the subject of unavoidable hæmorrhage, I must say a word or two on the subject of Cæsarean section as a method of treatment. The late Lawson Tait was, I believe, the first to practise and advocate this procedure. Dr E. Gustav Zinke, Professor of Obstetrics and Clinical Midwifery in the Medical College of Ohio, in a paper in the *American Journal of Obstetrics and Gynæcology* for October 1901, strongly

advocated the proceeding, and in support of his opinion, quoted all the cases which had been reported up to that date, viz., 8. Of these 8 cases, 6 were subjected to ordinary Cæsarean section, and 2 to Porro's operation, and five mothers were saved and six children. Of 2 of the fatal cases he says they were hopeless when operated upon, and therefore should not be counted; but even taking the death-rate at 1 in 8, I fail to see any justification for the operation when the death-rate in properly managed cases is not more than 5 per cent., or 1 in 20. I am perfectly willing to admit that Cæsarean section will give a better chance to the child, but the mother should not be subjected to any extra risk in the interests of a premature child. I am not surprised that a brilliant surgeon like the late Lawson Tait should have advocated this method, especially as by his own statement he seems to have considered the death-rate under ordinary methods was something like 50 per cent., but I cannot understand a practical obstetrician doing so. The condition is one which has to be treated in most cases by general practitioners and under conditions where abdominal section is out of the question. I therefore have no hesitation in condemning the operation.

Accidental Hæmorrhage.—In this condition we may have to deal with external or internal hæmorrhage, or, in some cases, with the two combined. In the external form, if uterine contractions are at all active, rupturing the membranes and keeping up uterine action by massaging the uterus or compressing it by means of a tight binder is usually all that is required; but if the bleeding continues, steps should be taken to dilate and deliver by turning or forceps. In severe cases the only method of stopping the hæmorrhage is to get the uterus emptied. The Rotunda School is very strong in urging the use of the plug in all cases of the external variety. They maintain that this is the best method of treatment, and that there is no risk of converting an external into a concealed hæmorrhage. They say that as soon as the pressure within the uterus is raised above the blood pressure the hæmorrhage will cease, and that with a normal uterus this very quickly occurs when the blood is dammed back by the vaginal plug. I am quite willing to grant that, but I maintain that we rarely have a normal uterus

to deal with except in those extremely rare cases where the placental separation is the result of a severe accident. The term accidental hæmorrhage is somewhat misleading, as we do not often have anything like an accident to account for the bleeding. The fact that the placenta has separated goes to show that the uterus is not normal. If fairly strong uterine contractions are occurring, then the plug may be used with safety; but if there are no contractions, the danger of converting an external into an internal hæmorrhage is very great. I have seen one case in which this happened. The patient was brought into hospital in a moribund condition, with the uterus distended with blood almost to the bursting point.

In severe cases I believe safety lies in dilatation and emptying of the uterus as soon as possible, so as to get good retraction. Dilatation can be most quickly and effectually done by means of Champetier de Ribes' bag or the hand. Care must of course be taken not to tear the cervix. As soon as the child is born the hand should be passed into the uterus to clear out the placenta and clots. Ergotin should be injected at once, and a hot douche given. If post-partum hæmorrhage continues, the uterine cavity and vagina should be very firmly plugged. Suprarenal extract may be injected into the uterus, or the plug may be wrung out of it. A saline infusion should be given if there has been much bleeding or when there is great shock. I usually get an assistant to give the infusion while I am delivering the patient.

The most fatal of all forms of hæmorrhage, however, is the concealed variety. If the uterus is very much distended, the outlook for the patient is exceedingly bad. Rupturing the membranes in such a case will merely precipitate matters, as the evacuation of the liquor amnii will only make more room for blood to be poured out. Delivery by *accouchement forcé* does not hold out much brighter hopes if the bleeding has been severe. I have unfortunately seen a good many cases of this kind, and the results from *accouchement forcé* have usually been disastrous. Removal of the uterus by Porro's operation has been advocated, and has been practised successfully, and if one is in a position to do the operation, I certainly think it ought to be tried. These bad cases are rare, and they would

be rarer if we were more on our guard to detect the condition early. I remember the first case of this kind I ever saw puzzled me somewhat. There was no external bleeding, but the patient complained bitterly of pain of a continuous nature in her abdomen. I do not think that in books sufficient stress is laid upon this symptom. If you are able to recognise the condition early, do not wait, but at once proceed to dilate and empty the uterus before the patient has lost sufficient blood to bring about collapse.

Hæmorrhage in the Early Stage of Labour.—This may be due to the separation of a normally situated placenta, but as I have already stated, I believe that in most cases it is due to a slight form of placenta prævia. Usually the only treatment necessary is to rupture the membranes, and get the uterus to contract well. In some cases, however, a much more serious condition may be present, viz., a commencing spontaneous rupture of the uterus. It is impossible to guard against this and there is no means of diagnosing the condition until the rupture has occurred. The treatment then will be abdominal section and removal of the uterus.

Recently, I had to deal with rather an unusual form of hæmorrhage in the first stage of labour, viz., a very large hæmatoma of the vulva. It developed shortly after the onset of labour, and was so large that it blocked the passage of the child. When the second stage was reached a free incision was made, the clot turned out, and delivery effected by forceps. I then stitched the cavity from the bottom with a continuous catgut suture, which effectually controlled the bleeding. It healed completely.

In this short epitome there are many points which I have refrained from dealing with, but I trust they will be taken up by subsequent speakers.

Dr Robert Barnes said that he was no longer up-to-date but behind the time in many points, but that, generally speaking, he agreed with what Dr Jardine had said about the treatment of placenta prævia. There was no point he wished specially to dilate upon, but he had great faith in the elastic uterine dilater he had contrived. It was a most

effective instrument, if used at the right time. In the treatment afterwards, the injection of hot water was extremely useful. The mode of abdominal compression was also of value, and if all of these methods were used together, the bleeding could usually be controlled. He heartily agreed in the treatment by turning and pulling a leg down — the child's body or buttock formed an excellent plug, and exerted pressure on the wall of the uterus. It afforded him intense pleasure in his retirement to come and see this gathering of old and new friends uniting in harmony of work.

Professor Simpson congratulated the President in having called on the Nestor of British midwifery to continue the discussion. The younger Fellows of the Society might well be proud of being present at this meeting, and of being able to tell to another generation that they had heard Dr Barnes speak to them of his experience. He considered Dr Jardine's paper an eminently lucid and satisfactory exposition of many points concerning accidental and unavoidable hæmorrhage. Dr Jardine had thrown out an important point in mentioning the carelessness of women with regard to losses of blood. These patients who in labour suffered from placenta prævia were likely to have been the subjects of endometritis, and liable to menorrhagia; and they might have considerable loss without paying much attention to it. It was of the utmost importance that pregnant women with any hæmorrhage should be at once seen to. If temporary treatment was carried out upon the first occasion, certainly on any intimation of further hæmorrhage the practitioner should return prepared to carry out more active interference. The worst cases were those in which there had been two or three repeated hæmorrhages, not very large, perhaps, and in which neither the woman nor the general practitioner were alarmed at the loss of blood; but in which, when labour set in, a comparatively small amount of hæmorrhage proved fatal. Active and energetic treatment should be carried out in the second appearance of hæmorrhage. Packing of the vagina was good treatment, and he considered a set of Barnes' bags extremely serviceable, as the largest size could be introduced into the vagina to begin with, and that prepared the way

for further dilatation—if need existed—of the cervix with a smaller size, till turning could be effected and a leg of the child brought down. He was in doubt as to the value of vaginal plugging in cases of accidental hæmorrhage. There might be some cases in which it would be serviceable possibly by the fact of its acting as a stimulus to the uterus, and not simply by preventing further escape of blood. In some cases, where the hæmorrhage took place into the uterus itself, packing the vagina was, to his mind, a very doubtfully good treatment, and in these cases it would be better again to have recourse to dilatation of the cervix. Dr Jardine had spoken as if dilatation were always carried out with a hydrostatic dilater. But in these cases possibly would come in the use of the Bossi dilater which he had shown to the Society on a previous occasion. He had not yet had an opportunity of putting it into practice in any case of this kind, but he quite believed that in these accidental hæmorrhage cases it would give a more rapid dilatation than with hydrostatic dilaters. The dilatation it gives seems to be entirely safe, and not associated with any laceration of tissue. As to the hæmorrhages in the early stages of labour, of which Dr Jardine had enumerated some, he would like to mention one form that was not placental nor uterine, but decidual, where the decidua itself had remained vascular in the lower segment of the uterus; but where there is no placental tissue whatever. This vascularity of the decidua, at a distance from the placenta, occurred sometimes higher up in the cavity of the uterus; but he had had one case in which it had reached the lower uterine segment, and in which there had been hæmorrhage difficult to account for, as there had been no other signs of placenta prævia, and in which the explanation was seen only after the expulsion of the secundines.

Dr Berry Hart said that the chief interest of the discussion that afternoon was to hear what the general practitioner thinks of the treatment he has been taught as to placenta prævia and accidental hæmorrhage. The question of treatment was a very wide one. He thought they should first decide what was the best treatment for

placenta-prævia, and say nothing as to classification, except perhaps to introduce the word *overlapping* for cases where the placenta ran on the margin of the os externum. Where the hæmorrhage was severe, the cervix should be dilated; and when they were able to get two or three fingers into it, the bipolar version should be carried out, and one or both legs should be brought down, and then the case should be allowed to go on as a footling one. In the first twelve cases he had had, he had turned and delivered. In the twelfth case, in delivering an old multipara, he had taken too long a time, and the patient had died. He believed they would save more children if cases were treated by bringing one leg down and making it protrude, and then allowing labour to go on quietly. While the footling case was going on slowly the woman could, if necessary, be stimulated thoroughly by submammary injection of saline fluid, by strychnine, etc. If there was post-partum hæmorrhage, the placenta should be removed, and there should be careful tamponing of the lower uterine segment and vagina with iodoform gauze. While delivery was going on as a footling case, the practitioner should have all antiseptic precautions ready, and his hands cleansed, and the patient cleansed, so that if there were hæmorrhage afterwards, he would be at once ready to proceed to treatment. In accidental hæmorrhage the most valuable treatment was to rupture the membranes and dilate and bring down a foot, stimulating as freely as possible, and delivering.

Professor Kynoch said he thought the line of treatment expressed by Dr Hart would meet with the general approval of the meeting. The treatment of placenta prævia is bipolar version. There may be some difference of opinion as to the best method of treatment before the os was sufficiently dilated to permit of turning—plugging the cervix and vagina, or the introduction of a tent, were the alternatives when bleeding continued. In his own experience he had employed both methods, and had so far no reason to consider one method better than the other. When the cervix was dilated sufficiently to admit one finger, further dilatation by digital manipulation was generally easy. What had specially struck him

in cases of placenta prævia was the importance of thorough aseptic precautions on account of the increased tendency to sepsis. In cases of accidental hæmorrhage, he thought that in slight cases one was justified in temporising, the question of active interference depending on the amount of hæmorrhage. If the bleeding was copious, the uterus must be emptied. In premature cases, puncture of the membranes was sufficient; in cases at or near full time one required after dilatation of the cervix to puncture the membranes, and effect delivery.

Dr Munro Ker said that there were so many anxious to speak on this interesting subject, that he would only give them the results and treatment of his own cases. He found on looking over his record, that he had himself treated ten cases of placenta prævia. He had had no maternal mortality, but a maternal morbidity of two, giving a morbidity of 22 per cent. The first case was a very bad septic one, which he had not seen for some hours after bleeding had commenced, and which had been freely handled by another practitioner and by a nurse previously, and in which he did not think he had been to blame. The second case became septic; it was one in which he had packed the vagina and cervix with gauze on two occasions. In the ten cases four children had survived, giving a mortality of 60 per cent. Two were born macerated, three were dead before or immediately after the commencement of treatment, and died during the operation. The treatment by rupturing the membranes and separating the placenta from the lower part of the uterus and performing version, and then allowing labour to go on, was quite safe and satisfactory. In his treatment, in seven cases he performed version, in three he delivered with forceps. In two cases, before performing version he had plugged. He considered that plugging in placenta prævia was not always effective (in one of his own cases certainly the bleeding had continued). As to palliative treatment, he considered it most undesirable to risk such a treatment. In one hospital case, attended by a fellow practitioner, the patient had had two slight hæmorrhages, and the child not being viable, the pregnancy had been allowed to go on till the child became viable; but the patient did not send in time, and before any one arrived,

the woman was in a collapsed condition, and died very shortly afterwards. Palliative treatment, especially in hospital practice, he did not consider desirable treatment in placenta prævia. As to the treatment generally, it was most important to make the diagnosis of the variety with which one had to deal, because the treatment varied considerably according to the variety. As to central placenta prævia, it was most desirable if the os were sufficiently dilated to turn, or to plug and turn, as soon as bipolar version could be done. If lateral or marginal, especially the marginal variety, it is quite sufficient to separate the placenta from a small portion of the lower part of the uterus and plug, and when the dilatation was sufficient, to perform version or deliver with forceps when the os was fully dilated. As to accidental hæmorrhage, he had had seven severe cases—two of concealed hæmorrhage. In all cases the mother had survived—there was no maternal morbidity, all the children except one were born dead. In five cases of apparent accidental hæmorrhage he had plugged, and he strongly agreed with the teaching of the Rotunda School as to the benefit of plugging in these cases. After sufficient dilatation had been obtained, it was desirable to rupture the membranes before turning or allowing the head, if it presented, to come down. In his cases of concealed accidental hæmorrhage, he had ruptured the membranes and allowed the labour to continue, and in both cases the result had been satisfactory. He was strongly opposed to *accouchement forcé* in all forms, unless it were absolutely necessary for the sake of the mother, because of the injuries to the cervix and the much greater risk of infection; and he believed in more palliative and less active treatment in these cases.

Dr Miller said he had not intended to take part in the discussion, but he had listened with pleasure and profit and interest to the discussion, and agreed very much with the line it had taken, and had not very much to add to it. Within the last few weeks, he had been called in consultation to see a case in which there had been an alarming gush of hæmorrhage in a lady who was nearly at full time. She had risen during the night, and on going back to bed

was seized as already stated. Her own medical attendant thought it a case of central placenta prævia, but under chloroform, Dr Miller found that it was marginally situated. The os was dilated digitally, the membranes ruptured, and delivery effected by podalic version. Both mother and child did well. This patient had had no pains, but he believed in an early delivery, for he had no faith in waiting —the sooner the uterus was emptied, the better both for mother and child. Recently he also had under his care a lady who had suffered from endometritis with retroversion, whom he had curetted, and who subsequently became pregnant, and he had been called in again to see her on account of a discharge of blood. As this had been going on for a short time, he urged her to go home and go to bed. He has since learned that her case was one of placenta prævia. He wondered whether after curetting there is more risk in a subsequent pregnancy of this condition. His practice was certainly to empty the uterus as soon as possible, and he always administered ergotin hypodermically in all cases, whether there was post-partum hæmorrhage or not.

Dr Haig Ferguson thanked Dr Jardine for his excellent introduction. One point with regard to placenta prævia was, that they should distinguish between accidental hæmorrhage in placenta prævia, and unavoidable hæmorrhage, in determining the prolongation of palliative remedies. If in placenta prævia the hæmorrhage was really accidental, *i.e.*, begun before labour had commenced, one was quite justified in palliating for a longer time than would otherwise be safe in the interests of both mother and child, presuming that the pregnancy was not so far advanced as to make a viable child possible. On the other hand, if the hæmorrhage was due undoubtedly to labour having commenced, as is frequently the case, palliative remedies were not to be considered for any length of time. If the patient were in an out-of-the-way place, far from prompt medical attendance, she should be treated at once. If in hospital, under due supervision, one might be tempted to palliate more. As to the question of mortality in placenta prævia, it is said to be 23 per cent. in outside practice, in hospital 5 to 10 per cent. Was this

difference due to the patient being under constant supervision, or to some difference in the treatment? The great mistake made in cases of placenta prævia, and to my mind one great factor in causing this mortality—apart from sepsis—is that of trying to hasten delivery after stopping the hæmorrhage, as Dr Berry Hart has already pointed out. The results would be much better if practitioners would be content after plugging the vagina (the best thing to stop the hæmorrhage), performing bipolar version and bringing down one foot, then to leave the case alone, and not hasten delivery. By this means you avoid tearing the cervix, and give the patient time to recover from the exhaustion consequent on the loss of blood, which renders more immediate active treatment dangerous. As to accidental hæmorrhage, I entirely protest against Cæsarean section, or Porro's operation or any such surgical interference. I strongly believe in the Dublin teaching of plugging for accidental hæmorrhage. Under certain conditions, when labour has commenced, the pains are strong, the os dilated (or dilatable), and the hæmorrhage severe. The proper treatment is to rupture the membranes, apply an abdominal binder, and deliver, possibly by turning or forceps. With an atonic condition of the uterus in cases of accidental hæmorrhage, where the cervix is rigid and unable to admit even one finger, the proper treatment is to plug the vagina firmly and thoroughly, and apply an abdominal binder to prevent blood accumulating in the uterus. He had never seen apparent hæmorrhage converted into concealed, when this method of treatment had been carried out. As to plugging, there was plugging and plugging. Plugging, as one often sees it carried out, was extremely unsatisfactory. If done with plugs of wool or gauze properly inserted, it had undoubtedly a most excellent effect. Most people seem to regard a plug merely as a cork, whereas in reality, its main use is to dilate the cervix. This it does partly by direct pressure on the cervix itself, and partly by stimulating uterine contraction in the following way. The properly-applied plug presses on the uterine arteries in the lateral fornices to such an extent as to interfere distinctly with the flow of blood through them, thus lessening the supply of blood to the uterus. In this way an increased quantity of

carbonic acid gas is accumulated in the uterine sinuses, which stimulates the uterus to active contraction, and so prevents concealed hæmorrhage. If, with this treatment, as statistics seem to show, we have very good results so far as the mother is concerned, it is, in my opinion perfectly unjustifiable to attempt or suggest any abdominal operation. Further, in cases of severe hæmorrhage, the chances are that the child is dead, and there would therefore be no advantage in performing an abdominal operation for the sake of the child. If the mother can be saved—as I believe is possible—by treatment in the ordinary way, then I consider there is no question whatever as to which is the best method.

Dr Herbertson said that he agreed in the main with what Dr Jardine had brought before them. As to the treatment of placenta prævia, it depended very much on what kind of practice one had. In a working-class population one cannot get women to lie in bed, and therefore the danger of placenta prævia is very much greater. Hæmorrhage is not thought so much of by the working-class patient, and the doctor was not called in till very late. In these cases, therefore, where the hæmorrhage was at all severe, it was safer to bring on premature delivery. He had found plugging to be the best treatment for placenta prævia, packing the plugs very tightly, and he also used quinine in 5-grain doses, believing that it stimulated the uterus. A good many practitioners do not now use ergotin, but that drug should be injected hypodermically in all cases.

Dr Michael Dewar said he did not think he could add anything of interest to what had been already said, chiefly because from the law of averages, medical men could only have a very few cases of placenta prævia in a lifetime, and perhaps a few more of accidental hæmorrhages. In his own practice of over 2000 cases he had had three cases of placenta prævia. The chief point for the practitioner is to try to distinguish between unavoidable and accidental hæmorrhage, so that the proper treatment could be decided upon. It was not always easy to make the diagnosis between the forms, especially when considerable rushes of blood were taking place, and when the os was not sufficiently obliterated to allow of the introduction of

a finger. One of the most important helps to diagnosis is to observe when the chief rushes of blood took place, and perhaps also to a certain extent the softness and bogginess of the cervix in placenta prævia. He might perhaps be allowed to mention a case that had occurred in his practice about twenty years ago, when a woman in her fourth pregnancy had a blood discharge lasting for two to three days every month up to the seventh month; it then ceased, and she was delivered at term of a healthy child, and made an excellent recovery. He had never been able to satisfy himself as to the exact cause of this condition, and would be pleased to hear if any other Fellow had had a similar experience. In the treatment of his cases, as soon as he had made the diagnosis that it was a placenta prævia, he always plugged the vagina tightly, waited till the os was sufficiently dilated to allow of the introduction of two fingers, then performed bipolar version, ruptured the membranes, brought down a foot, and then took it easily; for one was always able to control the hæmorrhage by traction in the leg. Of the three cases, two mothers recovered, and one died, one child lived, one was born alive—but died in a few hours—and one was stillborn. As to accidental hæmorrhage, if he could satisfy himself that it was not placenta prævia, and if the os were in any way dilated, he ruptured the membranes at once, and delivered by forceps or turning. In these cases he had always concentrated his attention entirely on the mother to the exclusion of the child.

Dr Balfour Marshall said he had come to learn, and not to take part. His experience was decidedly small. He had had six cases of placenta prævia, and two of accidental hæmorrhage. As to plugging, in cases of accidental hæmorrhage, he must speak from second hand—a student of his had recently had one in Dublin, and had seen twenty cases of this condition, and the first point there was to plug the vagina, and, as Dr Ferguson had mentioned, the very important part was to plug thoroughly. With regard to plugging the lower uterine segment in post-partum hæmorrhage after placenta prævia, he had seen two cases in Berlin where this treatment had been carried out, and the plugging had been done most carefully, but both died, the bleeding

still continuing. As to his own treatment of cases, he always carried out the lessons he had learnt from Professor Simpson and Dr Berry Hart.

The President congratulated the meeting on the interesting and useful discussion which they had listened to. Its success was in no small degree due to the systematic and lucid opening by Dr Jardine. A few points had been specially emphasised by different speakers, viz., that whereas asepsis is always important, it is specially so in cases in which hæmorrhage occurs; that delay in ante-partum hæmorrhage should be avoided, because frequent small hæmorrhages are often more serious than a single copious bleeding; that, although much had not been said regarding the different courses to be followed in different degrees of placenta prævia, the general opinion was that when turning was resorted to and a foot brought down, the case should thereafter, if possible, not be hastened but left to nature; that if post-partum hæmorrhage occurred in placenta prævia, plugging was the only safe course. The difference of mortality in placenta prævia cases treated in hospital and those in general practice, was probably not entirely due to the more favourable treatment in hospital, but partly to the different methods of determining which are cases of placenta prævia. There was an enormous difference, even among hospital physicians, as to the frequency of its occurrence. The gravity of concealed accidental hæmorrhage, doubtless, depended on its severity. The speaker's experience did not correspond with that of Dr Haultain, he had only had four cases, but they all terminated favourably to the mother, three children were deadborn, the fourth only survived about twelve hours. In each case he had deemed it advisable to dilate the os, to rupture the membranes, and to turn. The President regretted that owing to the lateness of the hour, the meeting would not have the privilege of hearing others who were ready to speak.

Dr Jardine in reply said he had not much to add, except to thank them for the way they had received his remarks. Professor Simpson had referred to menorrhagia in these cases of placenta prævia. Many of these patients suffered from it before impregnation, and if he had dealt with the etiology he would

like to have said something on the matter. He had said nothing in his paper about antisepsis or asepsis. Perhaps he should have dwelt upon it, but nowadays one was so accustomed to take it for granted that every one believed in it and practised it. Certainly, if in every case the strictest antisepsis and asepsis be not practised, the morbidity would be considerable. Dr Haig Ferguson had referred to the mortality of placenta prævia in general practice at 23 per cent. It was very difficult to form an estimate. In the Maternity Hospital it was now 5 to 6 per cent. In a table of 150 cases he had published, it had been 17 to 18 per cent., but in the last hundred of these, which had been the more recent ones, it had fallen to about 7 per cent. It must be understood that in hospital statistics, the fact that they had often to deal with cases brought in almost moribund must be taken into account; 23 per cent. was certainly too high a mortality. He had himself now treated a good many in private practice and in consultation, and, roughly speaking, had lost one in twenty. Dr Haig Ferguson had been rather severe upon him, suggesting Porro's operation as concealed accidental hæmorrhage. The first case of this kind he had seen was in a private case; labour had come on, a practitioner had been called in and had given opiates. When he saw the case, she was pretty far through. He had waited on till the os was pretty well dilated, but the woman died in a few minutes, and he turned out a bucketful of clots from the uterus. In another case in which the vagina had been plugged for twelve hours, the woman was carried into the hospital, and said at the time that she felt she was going to burst. He dilated the os quickly, performed version, and turned out the clots, but the patient died in a very few minutes. There were some of the cases to which he referred, in which the uterus was so dilated that it was on the point of bursting, and in which there was no dilatation of the cervix. In these cases where he had attempted delivery, the patients had all died, and in the next case of the kind he would remove the uterus. Dr MacVie was asking about such a uterus being able to expel the child if left to itself. He did not think the child would ever be expelled in such a case. After delivery the uterus had remained like a flabby football, and did not con-

tract at all. He had not tried plugging, as one case in which he had seen it done had turned him against it. Dr Balfour Marshall spoke of some one having seen twenty cases of accidental hæmorrhage in six months. That was a large order; of course, if they plugged in every case of trickling of a little blood, they would get good results. If there were good uterine contractions the plug would do no harm, but would act as a stimulus; but these were the cases that could be dealt with otherwise, by turning and delivery, or rupturing the membranes and allowing nature to finish the labour. Dr Dewar mentioned a case of hæmorrhage during pregnancy, in which the woman had gone on to full time. He had had two or three cases of the kind, and had referred to them in a paper he had written. In one case the patient had had continuous hæmorrhage during the whole pregnancy, but she was delivered at full time. Another case had had bleeding for three to four months, and he thought it was a case of molar pregnancy, and examined under chloroform, but could make out nothing, and decided to let her alone, and she also was delivered at full time. He did not know how to explain such cases.

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